CCD-TR28/TR30/TR350/TR350PK

RMT-708

SERVICE MANUAL

US Model
CCD-TR28/TR30

Canadian Model
CCD-TR30

E Model
CCD-TR350/TR350PK

Tourist Model
CCD-TR350

Video8 Handycam

Photo : CCD-TR30

A MECHANISM

The remote commander RMT-708 is not provided for CCD-TR350/TR350PK and cannot be used for it.

For MECHANISM ADJUSTMENTS, refer to the "8 mm Video MECHANICAL ADJUSTMENT MANUAL Ⅳ" (9-973-199-11).

SPECIFICATIONS

System

Video recording system	Two rotary heads, Helical scanning FM system
Audio recording system	Two rotary heads, FM system
Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassette (standard 8 mm)
Tape speed	SP mode: Approx. 19/32 inches (1.43 cm)/s LP mode: Approx. 5/16 inches (0.72 cm)/s (playback only)
Recording time	SP mode: 2 hours (P6-120)
Playback time	SP mode: 2 hours (P6-120) LP mode: 4 hours (P6-120)
Fastforward/rewind time	Approx. 6 min 30 s (P6-120)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (monochrome)
Lens	Combined 10 x Power zoom lens f = 1/4 to 2 7/16 inches (6.2 to 62 mm) F 1.6 to 2.9 (45 to 450 mm when converted to a 35 mm still camera) Filter diameter 1 1/2 inches (37 mm) TTL autofocus system inner focus wide macro system
Color temperature	Auto
Minimum illumination	2 lx (F 1.6)
Illumination range	2 lx to 100,000 lx
Recommended illumination	More than 100 lx

Input and output connectors

Video output	Phono jack, 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio output	Phono jacks −7.5 dBs, (at load impedance 47 kΩ) impedance less than 2.2 kΩ
RFU DC OUT	Special minijack, DC 5 V
Remote jack	Stereo mini-minijack (ø 2.5 mm)
MIC jack	Minijack, − 66 dBs low impedance with 2.5 to 3 V DC, output impedance 6.8 kΩ (ø 3.5 mm)

— Continued on next page —

MICROFILM

8 VIDEO CAMERA RECORDER

SONY®

General

Power requirements
On battery mounting surface
6.0 V (battery pack)
7.5 V (AC power adaptor)
Average power consumption
5.3 W (camera recording) including the viewfinder
Installation Vertically, horizontally
Operating temperature
32°F to 104°F (0°C to 40°C)
Storage temperature
−4°F to +140°F
(−20°C to +60°C)
Dimensions Approx. 4 3/8 x 4 3/8 x 7 1/8 inches (w/h/d) (109 x 109 x 178 mm)
Mass Approx. 1 lb 10 oz (750 g) excluding the battery pack, lithium battery, cassette and shoulder strap
Approx. 2 lb 2 oz (970 g) including the battery pack NP-55, lithium battery CR2025, cassette P6-120 and shoulder strap
Microphone Electric condenser microphone, monaural type

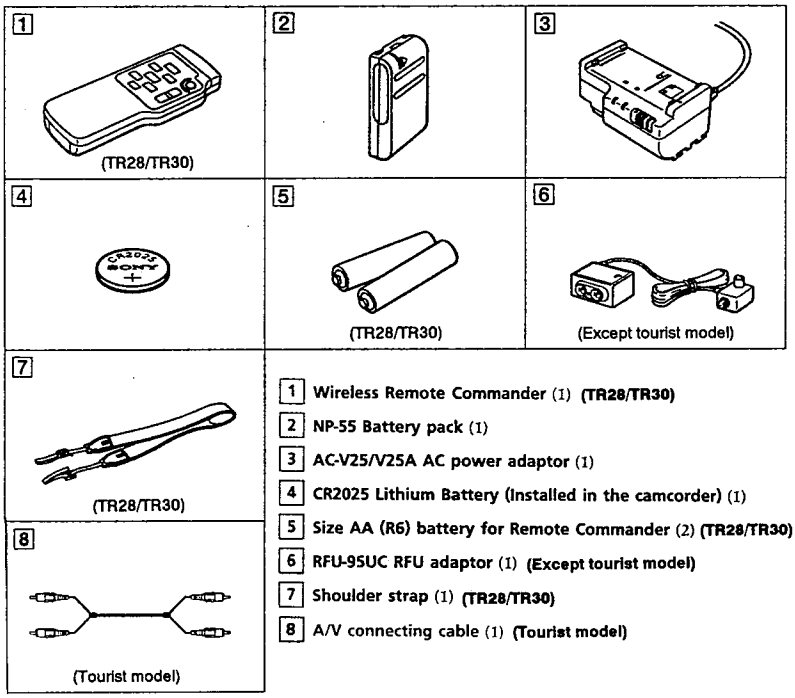
AC power adaptor

Power requirements
110-240 V AC*, 50/60 Hz
Power consumption
15 W (AC-V25) / 17 W (AC-V25A)
Output voltage DC OUT: 7.5 V, 1.2 A (AC-V25)
7.5 V, 1.5 A (AC-V25A)
in operating mode
Battery charge terminal:
10 V, 1.1 A in charge mode
Application Sony battery packs NP-55/55H, NP-60D, NP-66H, NP-77H, NP-80/80D
Operating temperature
32°F to 104°F (0°C to 40°C)
Storage temperature
−4°F to +140°F
(−20°C to +60°C)
Dimensions Approx. 4 1/8 x 1 15/16 x 2 1/2 inches (w/h/d) (103 x 49 x 63 mm) including projecting parts and controls
Mass Approx. 10 oz (290 g) (AC-V25)
Approx. 11 oz (320 g) (AC-V25A)

* Canadian Standard Association (CSA) certifies 120 V AC only.

Design and specifications are subject to change without notice.

Supplied accessories



1 **Wireless Remote Commander** (1) **(TR28/TR30)**
2 **NP-55 Battery pack** (1)
3 **AC-V25/V25A AC power adaptor** (1)
4 **CR2025 Lithium Battery (Installed in the camcorder)** (1)
5 **Size AA (R6) battery for Remote Commander** (2) **(TR28/TR30)**
6 **RFU-95UC RFU adaptor** (1) **(Except tourist model)**
7 **Shoulder strap** (1) **(TR28/TR30)**
8 **A/V connecting cable** (1) **(Tourist model)**

CCD-TR350PK is a model that soft carrying case is added in CCD-TR350. CCD-TR350PK is different from CCD-TR350 only in accessory and packing materials.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.

2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.

3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.

4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.

5. Check the B+ voltage to see it is at the values specified.

6. Flexible Circuit board Repairing
   - Keep the temperature of the soldering iron around 270°C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

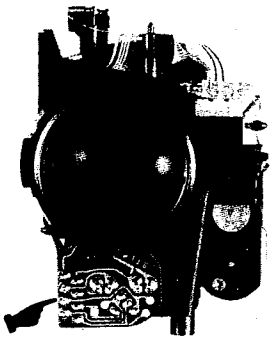
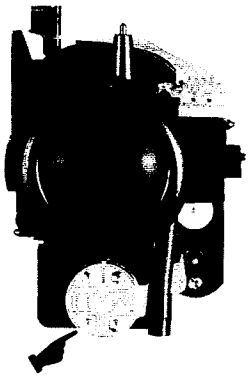
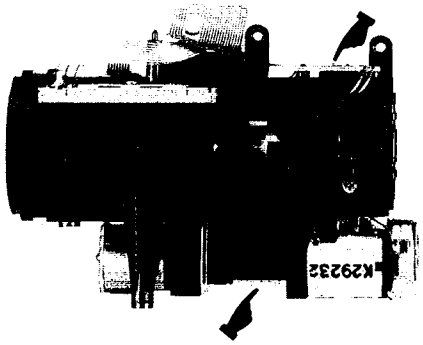
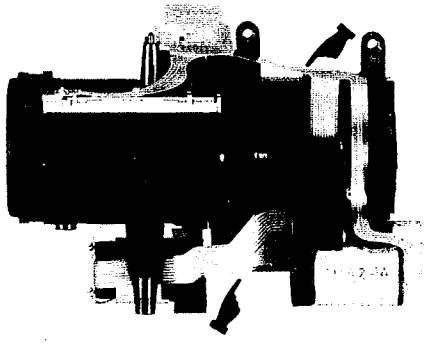
LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

【Zoom lens】

This unit employs two types of lens.
Note that the lenses are interchangeable, however their components are not.

Differentiating the lens

☛ : difference point

TYPE A (VCL-6210WC)	TYPE B (VCL-6210WF)
From the front of the lens 	From the front of the lens 
From the right side of the lens (as seen from the front) 	From the right side of the lens (as seen from the front) 

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There is the color reproduction standard frame at the back of the book.

SERVICE NOTE

[SEMICONDUCTOR FOR CORRECTION LIST DISPLAY]

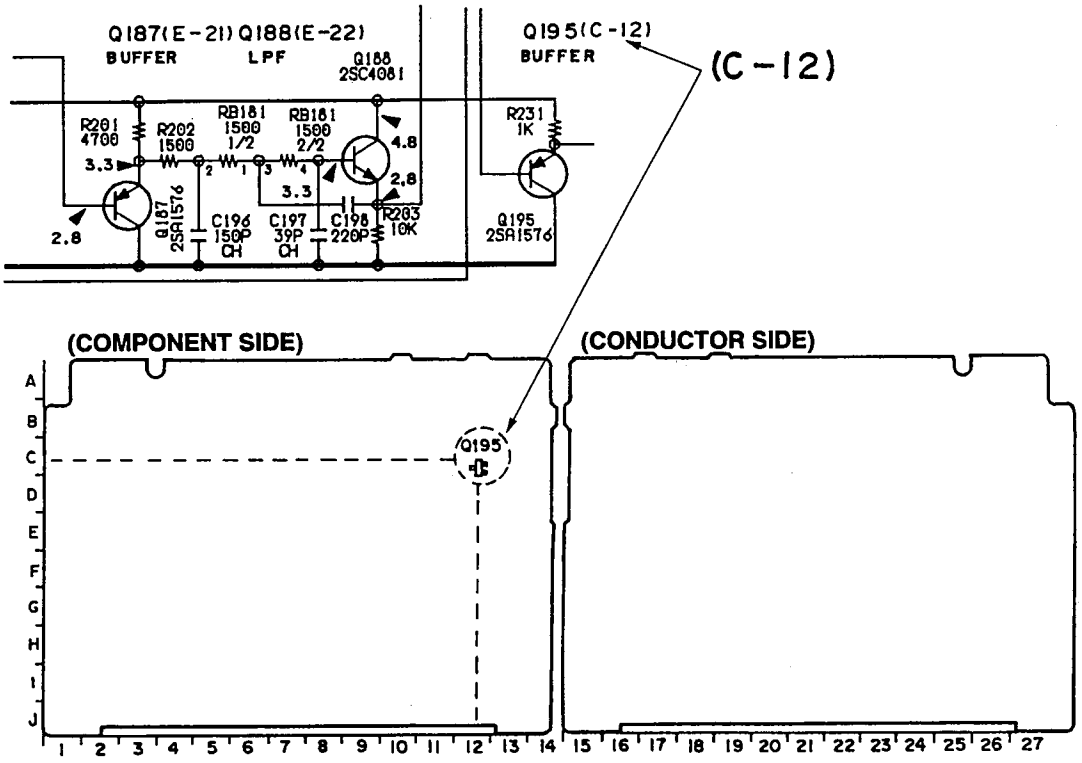
Part code and part name of the semiconductor for correction of the print board is discribed in the space of each print figure. Use this list when ordering parts.

[PARTS LOCATION DIAGRAM RELATED TO POWER SUPPLY]

The parts location diagram for the power supply which are often checked and replaced when repairing the fuse and IC link and so on. (See page 94, 95 104, 106, 129 and 131.)
This diagram is useful for repair.

[SEMICONDUCTOR LOCATION]

In this service manual, the mounted locations of the semiconductors (IC, transistor, diodes) are indicated in red in schematic diagrams. This enables to find the location on the board easily when servicing.



[HEAD CLEANING]

After an extended period of use the video image may become indistinct or may not appear at all during playback of a tape. The cause of this usually are dirty video heads. For remedy, cleaning of the heads is required.

Check for Head Clogs During Recording

① Use a blank tape, record a short section, then press the stop button to stop.
② Set to recording mode again.
③ If the [⊠] mark is flashing in the viewfinder at this time, head clogs are occurred.

Check During Playback of a Tape

① Play back a pre-recorded tape and display the image on a TV screen.
② If there is no sound and the image is unstable, no image appears on the screen, or tape transport is unstable, head clogs are occurred.

Remedy

[Cleaning method using a cleaning tape]

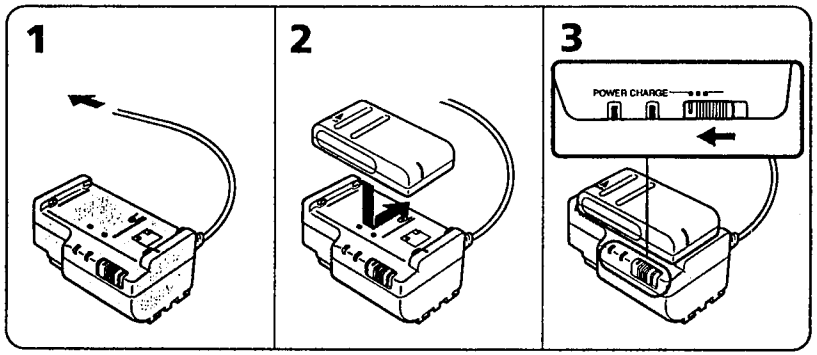
- Use the Cleaning Tape. (Please follow the instructions attached to the cleaning tape.)

Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge and install the battery pack. To charge the battery pack, use the supplied AC-V25/V25A AC power adaptor.

Charging the Battery Pack

Charge the battery pack on a flat place without vibration.
(1) Connect the power cord to a wall outlet. **(2)** Align the right side of the battery pack with the line on the AC power adaptor, then slide the battery pack in the direction of the arrow. **(3)** Set the selector to CHARGE. Charging begins.
When charging is completed, the CHARGE lamp goes out. Set the selector to the center position and unplug the unit from the wall outlet. Then remove the battery pack and install it on the camcorder.
To stop charging, set the selector to the center position.



Charging Time and Battery Life

Battery pack	NP-55 (supplied)	NP-80 NP-80D	NP-77H	NP-66H	NP-60D	NP-55H
Charging time*	70	180	160	120	90	80
Typical recording time**	30	80	75	55	40	35
Continuous recording time***	60	160	150	110	80	70

* Approximate minutes to charge an empty battery pack using the AC-V25/V25A (Lower temperatures require a longer charging time.)
** Approximate minutes when recording while you repeat recording start/stop and turning the power on/off. The actual battery life may be shorter.
*** Approximate continuous recording time indoors.

Important!

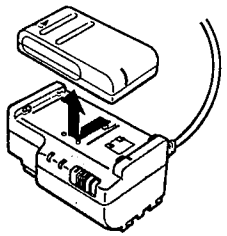
Use the battery completely before re-charging!

Before you recharge the battery, make sure the battery has been used up (discharged) completely. Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.

To use up the battery, remove the cassette and set the POWER switch to CAMERA with the battery attached, and leave the camcorder until the ⏀ indicator and the red lamp flash in the viewfinder.

Removing the Battery Pack

Slide the battery pack in the direction of the arrow (see drawing).



Note on charging the battery pack

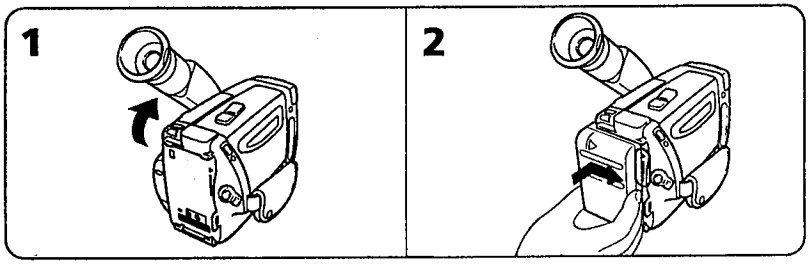
- The POWER lamp will remain lit for a while even if the battery pack is removed and the power cord is unplugged after charging the battery pack. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to CHARGE again.
- You cannot operate the camcorder using the AC power adaptor while charging the battery pack.

This section is extracted from CCD-TR28/TR30 instruction manual.

Charging and Installing the Battery Pack

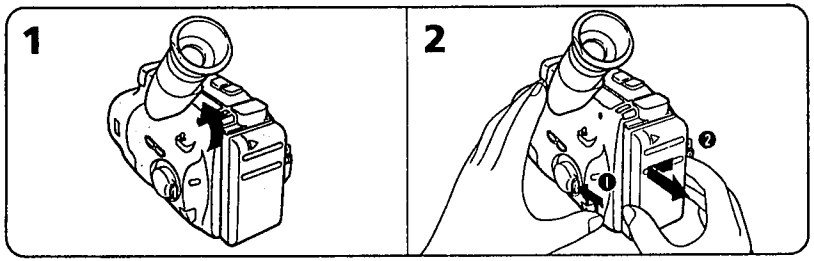
Installing the Battery Pack

(1) Lift up the viewfinder. (2) Align the right side of the battery pack with the white line on the camcorder, and slide the battery pack to the right.



Removing the Battery Pack

(1) Lift up the viewfinder. (2) While pressing BATT, slide the battery pack to the left.



Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

Preparing the Battery Pack

Always Carry Additional Batteries

Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

Battery Life is Shorter in Cold Environment

Battery efficiency is decreased and the battery will be used up more quickly if you are recording in cold environment.

To Save Battery Power

Turn STANDBY on the camcorder down when not recording to save battery power. **[a]**
A smooth transition between scenes can be made even if recording is stopped and started again. While positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

When to Replace the Battery Pack

While you are using your camcorder, the remaining battery indicator decreases gradually as battery power is used up.

When the remaining battery indicator reaches the lowest point, the ⮌ indicator appears and starts flashing in the viewfinder. **[b]**
When the ⮌ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, set the POWER switch to OFF on the camcorder and replace the battery pack. Leave the tape in the camcorder to obtain smooth transition between scenes after the battery pack is replaced.

Note on the remaining battery indicator

The remaining battery indicator of the camcorder may indicate a different remaining capacity from that of the battery pack with its own indicator (not supplied). The indicator of the battery pack is more accurate.

Tips for Using the Battery Pack

Note on the Rechargeable Battery Pack

The Battery Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

Battery Care

- Remove the battery pack from the camcorder after using the battery pack, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery right before using the camcorder.

How to Use the Switch on the Battery Pack

This switch is provided so that you can mark the charged battery. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up (or in whichever direction you want to remind yourself). [c]

The Life of the Battery Pack

The battery pack can be fully charged and discharged about 500 times under normal temperatures. If the battery indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Charging Temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperatures require a longer charging time.

Note on Charging

A Brand-new Battery

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

Before Recharging a Used Battery Pack

- Make sure to use up the battery before recharging.
- If recording is completed before the ◁□ indicator appears in the viewfinder, you should remove the tape, set the POWER switch to CAMERA, turn STANDBY up, and leave the camcorder until the battery indicator flashes rapidly.
- When you use the AC-S10 power adaptor, the DC-S10 car battery charger or BC-S10 portable battery charger, you can use the discharging function.
- **Charging the usable battery causes a lowering of battery capacity. Battery capacity can be recovered if you fully discharge and charge the battery again.**

After Long Storage

Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

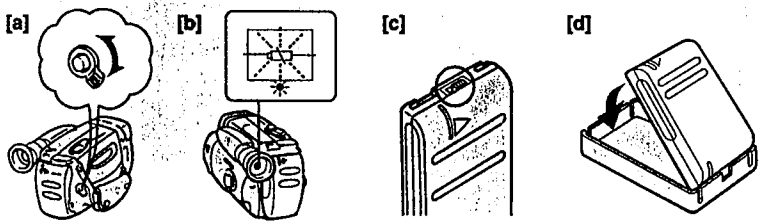
Note on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened. When the terminals are not clean or when the battery pack has not been used for a long time, repeat installing and removing the battery pack. This improves the contact condition. Also, wipe the + and − terminals with a soft cloth or paper.

Be Sure to Observe the Following

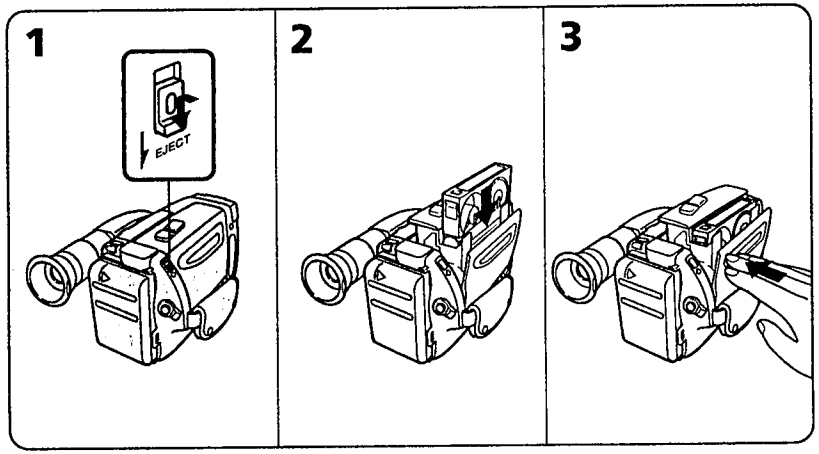
- **To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. Carry the battery pack attaching to the terminal cover. [d]**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

[a] [b] [c] [d]



Inserting a Cassette

Make sure that the power source is installed.
(1) While pressing the small blue button on the EJECT knob, slide it down. The cassette holder automatically lifts up and opens. **(2)** Insert a cassette with the window facing out. **(3)** Close the cassette holder by pressing the "PUSH" mark on the cassette holder.

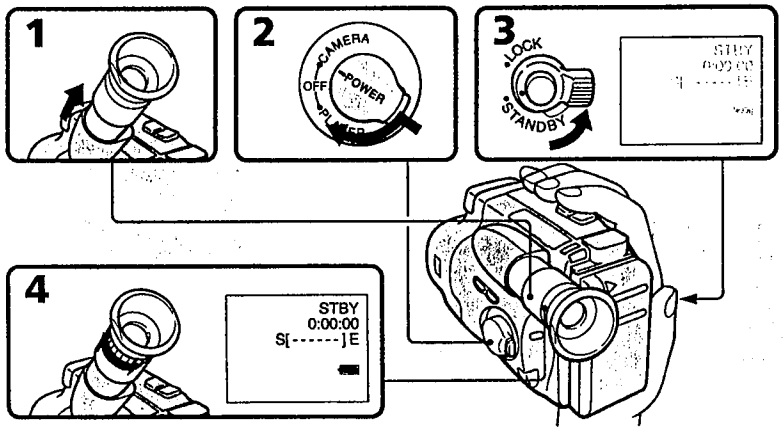


To Eject the Cassette

While pressing the small blue button on the EJECT knob, slide it down.

Adjusting the Viewfinder Lens

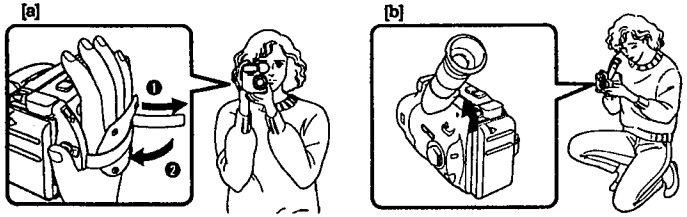
Before you use the camcorder for the first time or after someone else has used it, focus the viewfinder lens. Make sure that the power source is attached to the camcorder.
(1) Pull out the viewfinder until it clicks. **(2)** While pressing the green button of the POWER switch, turn it to CAMERA. **(3)** Turn STANDBY up. **(4)** Turn the viewfinder lens adjustment ring so that the indicators in the viewfinder come into sharp focus.



Hints for Better Shooting

For hand-held shots, you'll get better results by holding the camcorder according to the following suggestions:

[a] [b]

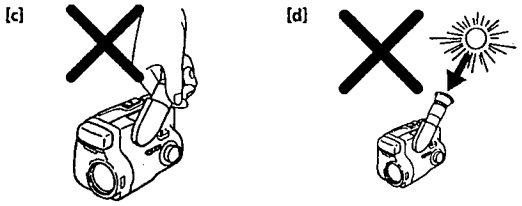


- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb. [a]
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it.
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can also record in a low position to get an interesting recording angle. Turn the viewfinder up for recording from a low position. [b]

Cautions on the Viewfinder

- **Do not pick up the camcorder by the viewfinder. [c]**
- **Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder heats up and may be damaged. [d]**

[c] [d]



Place the camcorder on a flat surface or use a tripod

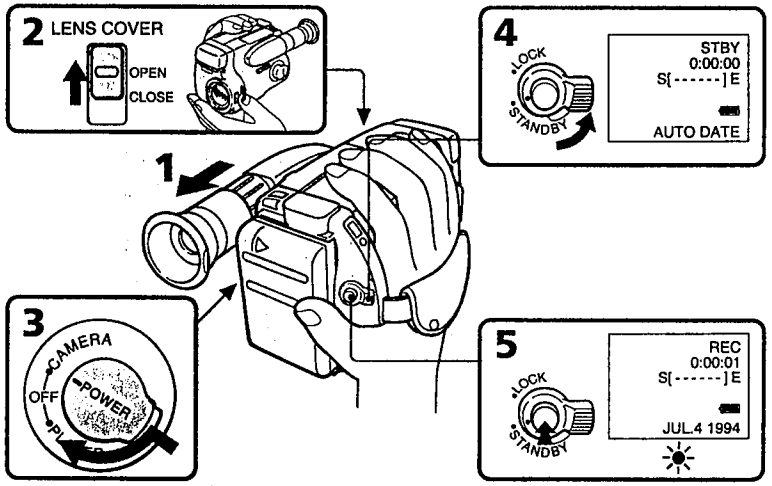
Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder (p. 33). Make sure the tripod screw is shorter than 9/32 in (6.5 mm).

Camera Recording

Make sure that the power source is installed and a cassette is inserted. When you start recording, the date is automatically recorded for 10 seconds (AUTO DATE feature). This feature works only once a day. You can use the Remote Commander to record yourself with your friends or family. When you use the Remote Commander, make sure that the REMOTE COMMANDER switch on the camcorder is set to ON (p. 37).

Before you record one-time events, you may want to make a trial recording to make sure that the camcorder is working perfectly.

(1) Pull out the viewfinder until it clicks. **(2)** Slide the LENS COVER switch to OPEN. **(3)** While pressing the green button of the POWER switch, turn it to CAMERA. **(4)** Turn STANDBY up. Adjust the viewfinder lens so that the indicators in the viewfinder come into sharp focus (p. 13). **(5)** Press START/STOP. As the camcorder starts recording, the red lamp in the viewfinder and the camera recording/battery lamp on the camcorder light up.



To Stop Recording Momentarily

Press START/STOP again. The "STBY" indicator appears in the viewfinder (**Standby mode**).

To Finish Recording

Turn STANDBY down and turn the POWER switch to OFF. Slide the LENS COVER switch to CLOSE and eject the tape (p. 12).

Notes on Standby mode

If you leave the camcorder in Standby mode for 5 minutes, the camcorder goes off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

Note on the tape counter

The tape counter indicates the recording or playback time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET.

Note on the AUTO DATE feature

- The AUTO DATE feature works once a day. However, the date may automatically appear more than once a day when:
  - you reset the date and time.
  - you eject and insert the tape again.
  - you stop recording within 10 seconds.
- Once the AUTO DATE feature turns off the date display 10 seconds after the start of recording, the date and time are displayed as follows:
  - If the date display setting has been made, the date is displayed.
  - If the time display setting has been made, the time is displayed.
  - If neither display setting has been made, nothing is displayed.

If you wear glasses

You can bend back the eyecup to get a better view of the viewfinder.

When moving from indoors to outdoors (or vice versa)

Turn STANDBY up and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

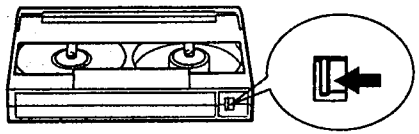
Note on recording

When you record from the beginning of a tape, run the tape for about 15 seconds before starting the actual recording. This will ensure that you won't miss any start-up scenes when you playback the tape. You can record tapes in SP (standard play) mode only.

Preventing Accidental Erasure

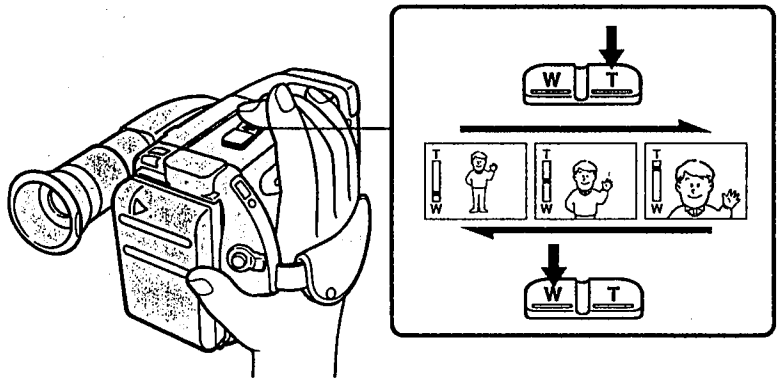
To prevent accidental erasure, slide the tab on the cassette to expose the red mark. If you try to record with the red mark exposed, the and ⏏ indicators flash in the viewfinder, and you cannot record.

To re-record on this tape, slide the tab back out covering the red mark.



Using the Zoom Feature

Zooming is a recording technique that lets you change the size of the subject in the scene. You can also use the zoom to decide on a shooting angle before you start recording.
For more professional-looking recordings, use the zoom function sparingly.
"T" side: for telephoto (subject appears closer)
"W" side: for wide-angle (subject appears farther away)



Zooming Speed (Dual speed zooming)

Press the power zoom button firmly for a high-speed zoom, press it softly for a relatively slow zoom.

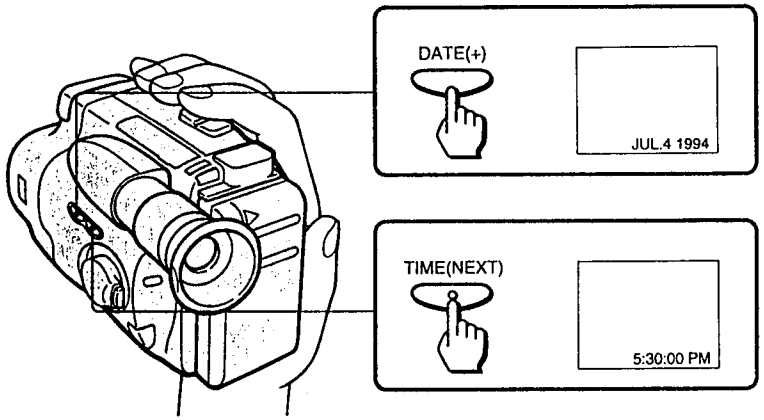
When you shoot a subject using a telephoto zoom

If you cannot get a sharp focus while in extreme telephoto zoom, press the "W" side of the power zoom button until the focus is sharp. You can shoot a subject that is at least about 31 1/2 inches (80 cm) away from the lens surface in the telephoto position, or about 1/2 inches (1 cm) in the wide-angle position.

Camera Recording

Recording the Date or Time

While you are recording, press DATE (+) or TIME (NEXT). The date or time displayed in the viewfinder is recorded with the picture. You cannot record the date and time at the same time. Except for the date or time indicator, no indicator in the viewfinder is recorded.



To Stop Recording with the Date and Time

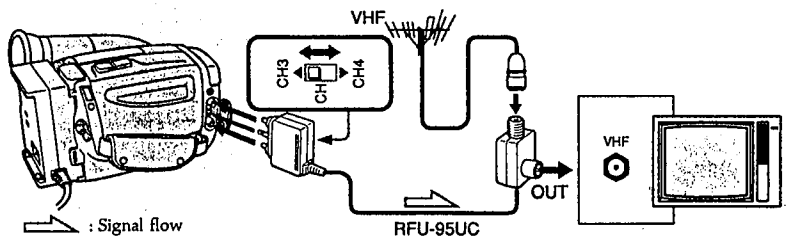
Press DATE (+) or TIME (NEXT) again. The date or time indicator disappears. The recording continues.

Connections for Playback

You can use this camcorder as a VCR by connecting it directly to your TV for playback. There are several ways to connect the camcorder to your TV.

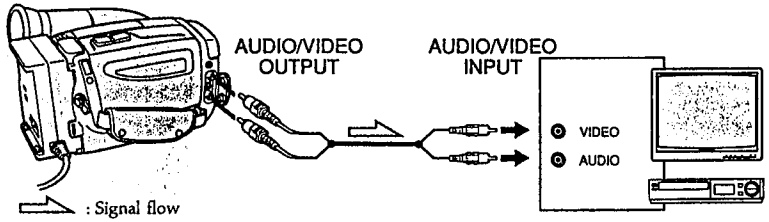
Connecting to a TV without Audio/Video Input Jacks

Connect the camcorder to the TV using the supplied RFU adaptor. Make sure that the TV is turned off to prevent speaker damage before hooking up your camcorder. Set the channel selector on the RFU adaptor and your TV to VHF CH3 or CH4, whichever is not active in your area.



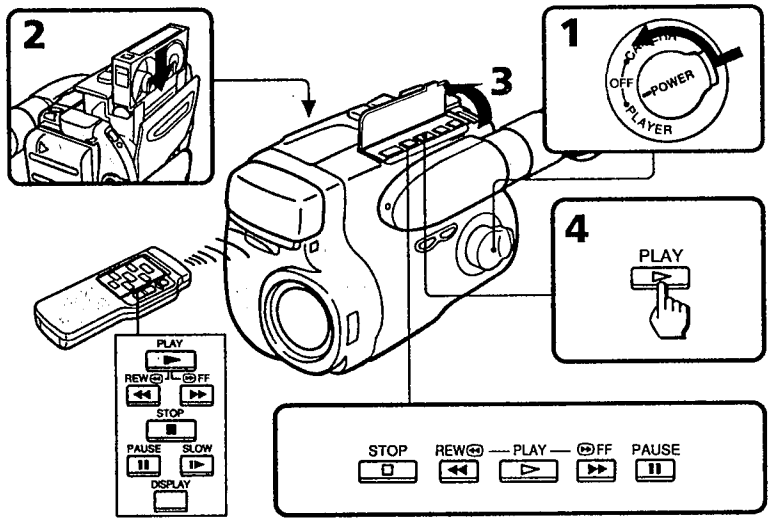
Connecting to a TV or VCR with Audio/Video Input Jacks

Connect the camcorder to the TV using an A/V connecting cable (not supplied). Set the TV/VCR selector on the TV to VCR.



Playing Back a Tape

You can monitor the playback picture in the viewfinder. You can also monitor the picture on a TV screen, after connecting the camcorder to a TV or VCR (p. 19). You can use the supplied Remote Commander to control playback, if you want. Before using the Remote Commander, make sure that the REMOTE COMMANDER switch on the camcorder is set to ON (p. 37).
(1) While pressing the green button of the POWER switch, turn it to PLAYER. **(2)** Insert the recorded tape with the window facing out. **(3)** Open the lid of the control panel. **(4)** Press ▷. Playback starts.



To stop playback, press □.
To rewind the tape, press ◀◀.
To fastforward the tape, press ▶▶.

Various Playback Modes

To view a still picture
Press ❚❚ during playback. To resume playback, press ❚❚ or ▷.

To locate a scene (Picture search)
Keep pressing ◀◀ or ▶▶ during playback. To resume normal playback, release the button.

To monitor the high-speed picture during fastforward or rewind (Skip scan)
Keep pressing ◀◀ while rewinding or ▶▶ while advancing the tape. To resume normal playback, press ▷.

To view the picture at 1/5 speed (Slow Playback) (only with the Remote Commander)
Press ❚► on the Remote Commander during playback. To resume normal playback, press ►. If slow playback lasts for about 1 minute, it shifts to normal speed automatically.

Note on playback
- Streaks appear and the sound is muted in the various playback modes.
- When still picture mode lasts for 5 minutes, the camcorder automatically enters stop mode.

To display the viewfinder screen indicators on the TV
Press DISPLAY on the Remote Commander. To erase the indicators, press it again.

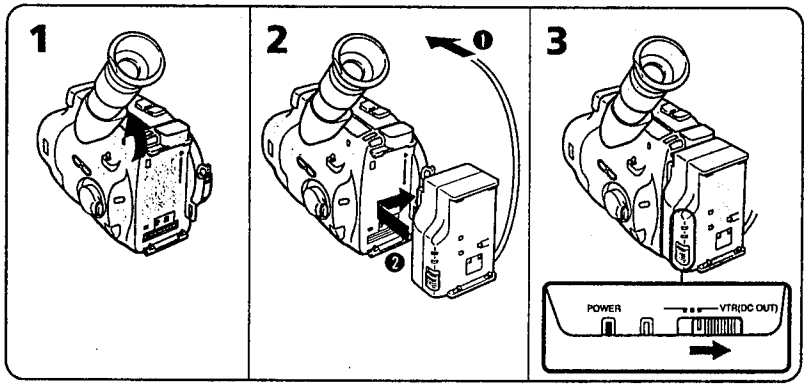
Using Alternate Power Sources

You can choose any of the following power sources for your camcorder: battery pack (p. 6), house current, and 12/24 V car battery. Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power source	Accessory to be used
Indoors	House current	AC-V25/V25A AC power adaptor (supplied), AC-S10, AC-V55
Outdoors	Battery pack	NP-55 Battery pack (supplied), NP-80/80D, NP-77H, NP-66H, NP-60D, NP-55H
In the car	12 V or 24 V car battery	DCP-77 DC pack

Using House Current

To use the supplied AC-V25/V25A AC power adaptor:
(1) Lift up the viewfinder. **(2)** Connect the AC power cord to a wall outlet. Connect the bottom of the AC power adaptor to the battery mounting surface of the camcorder. **(3)** Set the selector to VTR (DC OUT).



Note on the POWER lamp
- The POWER lamp will remain lit for a while even if the unit is unplugged after use. This is normal.
- If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to VTR (DC OUT) again.

To remove the adaptor
The adaptor is removed in the same way as the battery pack. (p. 8)

Using Alternate Power Sources

Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of the car (12 V or 24 V). Connect the DC pack to the battery mounting surface of the camcorder.

To remove the DC pack

The DC pack is removed in the same way as the battery pack. (p. 8)

Options for Charging the Battery Pack

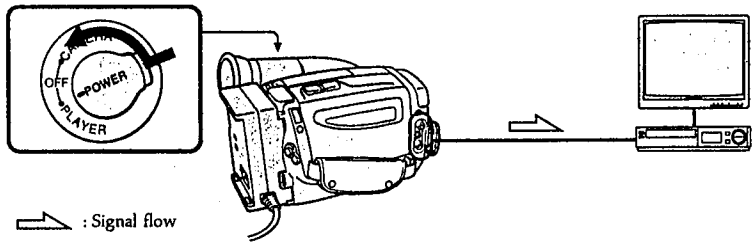
- AC-S10 AC power adaptor:
  You can charge a battery pack whether it is used up or not with this adaptor because it has a discharging function.
- BC-S10 portable battery charger (ideal for travel):
  You can charge a battery pack on 100-240 V AC current.

Editing onto Another Tape

You can create your own video program by editing with any other 8 8 mm, Hi8 Hi8, VHS VHS, S-VHS S-VHS, VHSC VHSC, S-VHSC S-VHSC, β Betamax or ED Beta ED Betamax VCR that has audio/video inputs.

Before Editing

Connect the camcorder to the VCR using an A/V connecting cable (not supplied). (p. 19)
Set the input selector on the VCR to LINE, if available. Set the POWER switch to PLAYER.



Starting Editing

(1) Insert a blank tape (or a tape you want to record over) into the VCR. And insert your recorded tape into the camcorder. **(2)** Play back the tape on the camcorder until you locate the point where you want to start editing, then set the camcorder in the playback pause mode. **(3)** On the VCR, locate the recording start point and set the VCR in the recording pause mode. **(4)** Press II on the camcorder and VCR simultaneously to start editing.

To Edit More Scenes

Repeat steps 2 to 4.

To Stop Editing Momentarily

Press II on the VCR.

To Stop Editing

Press □ on both the camcorder and the VCR.

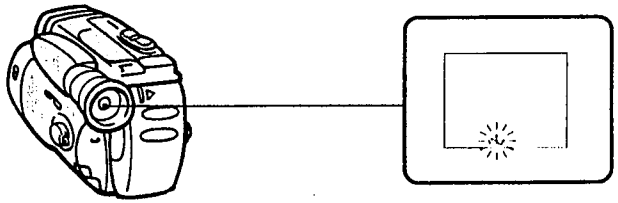
Note on the DISPLAY function

If you have displayed the viewfinder screen indicators on the TV, erase the indicators by pressing DISPLAY on the Remote Commander so that they will not be superimposed on the edited tape.

Additional Information

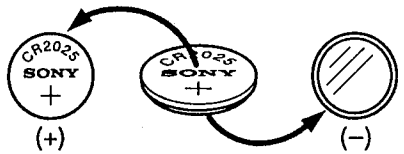
Changing the Lithium Battery

Your camcorder is supplied with the lithium battery installed. The lithium battery lasts for about 1 year under normal operation. When the battery becomes weak or dead, the indicator flashes in the viewfinder for about 5 seconds when you set the POWER switch to CAMERA.
In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of another battery may present a risk of fire or explosion.**



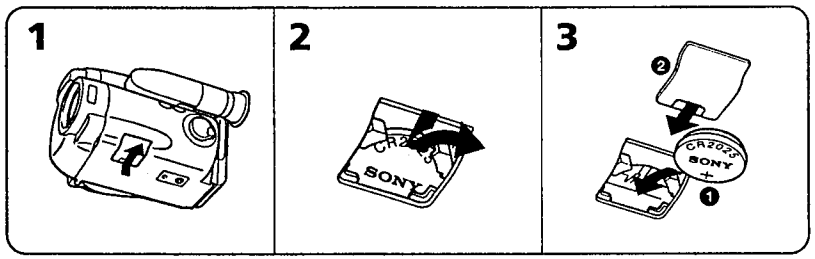
Note on Lithium Battery

The lithium battery has a positive (+) side and a negative (–) side as illustrated below.
Be sure to install the lithium battery with the positive side facing out.



Changing the Lithium Battery

When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date and time.
(1) Detach the lid of the lithium battery compartment on the bottom of the camcorder. **(2)** Push the battery down once and pull it out from the holder. **(3)** Install the lithium battery with the positive (+) side facing out. Replace the lid.

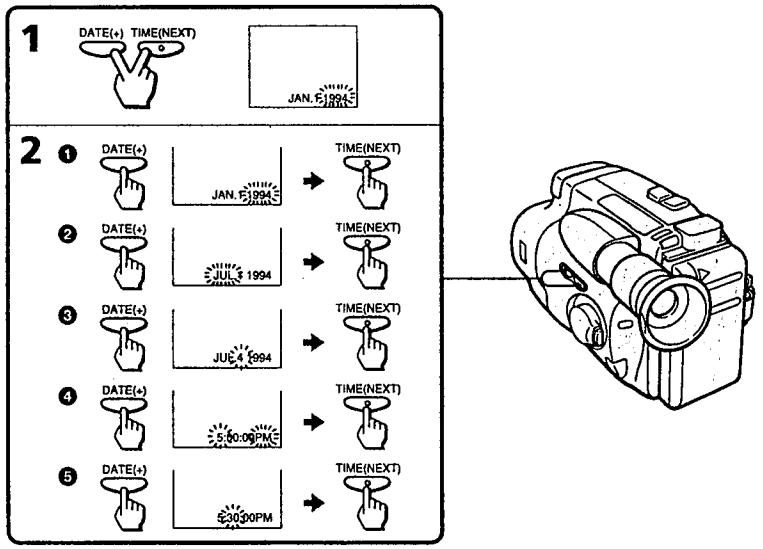


WARNING
The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

Caution
Keep the lithium battery out of the reach of children.
Should the battery be swallowed, consult a doctor immediately.

Resetting the Date and Time

Your camcorder's clock is set to East Standard Time at the factory, but you can reset the date and time. Set the POWER switch to CAMERA and turn STANDBY up. Adjust the digits in the viewfinder.
(1) Press DATE (+) and TIME (NEXT) simultaneously until the date appears in the viewfinder.
(2) Adjust the digits of the year, month, day, hour and minutes by pressing DATE (+) and TIME (NEXT). To set the year to 1994, there is no need to press DATE (+) in 2-❶. Note that when you keep DATE (+) pressed, the digits advance faster.



Resetting the Date and Time

To Correct the Date and Time Settings

Press TIME (NEXT) repeatedly until the minute digits stop flashing. Then repeat steps 1 and 2.

To Check the Preset Date and Time

Press DATE (+) or TIME (NEXT). When you press the same button again, the indicator goes off.

Note on the setting of the year

When you set the year, each time you press DATE (+) the digits change as follows.

1994 → 1995 → ----→ 2020

Note on the time indicator

The internal clock of this camcorder operates on a 12-hour cycle.
12:00 AM stands for midnight.
12:00 PM stands for noon.

Playback Modes

The playback mode (SP or LP) is selected automatically according to the format in which the tape has been recorded. The quality of the recorded picture in LP mode, however, will not be as good as that in SP mode.

LP (long play) mode

When you playback a tape recorded in LP mode, the LP indicator lights up in the viewfinder.
This camcorder cannot record a tape in LP mode.

Foreign 8 mm video

You cannot playback software recorded on a different TV color system. Because the TV color systems differ from country to country, you may not be able to playback foreign pre-recorded software. Refer to page 31 to check the TV color system of foreign countries.

Maintenance Information and Precautions

Video Head Cleaning

To ensure clear pictures, clean the video heads periodically. When playback pictures are "noisy" or hardly visible, the video heads may be contaminated.

[a] Slight contamination
[b] Critical contamination
If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy", repeat the cleaning. (Do not repeat cleaning more than 5 times.)

Caution

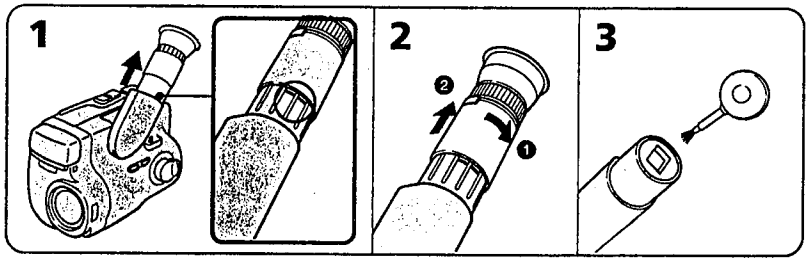
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note

If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

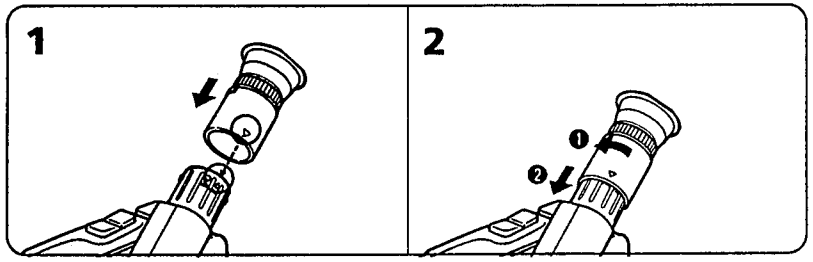
Removing Dust from inside the Viewfinder

(1) Pull out the viewfinder barrel until the illustrated mark appears. **(2)** Turn the viewfinder counterclockwise until it stops, and pull it out. **(3)** Clean the surface with a commercially available blower.



To Reattach the Viewfinder Barrel

(1) Align the mark on the viewfinder barrel with the mark on the viewfinder and push in the viewfinder barrel until it clicks. (2) Turn it clockwise until it stops and push it in.



Moisture Condensation

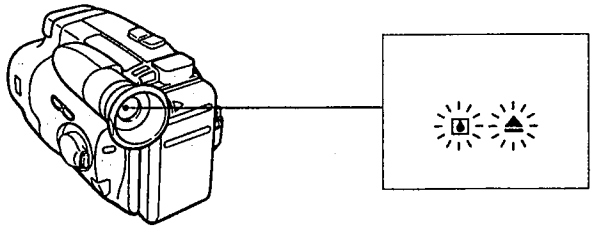
If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

Inside the Camcorder

When the [⬇] and ⏏ indicators flash in the viewfinder, moisture has condensed inside the camcorder. If this happens, no other functions except for tape ejection will work.

Eject the cassette, turn off the camcorder and leave it with the cassette holder open for at least one hour in a dry place.

The camcorder can be used again if the [⬇] indicator does not appear when the power is turned on again.



On the Surface of the Tape

If there is moisture on the surface of the tape, when the cassette is inserted and a tape transport button is pressed, the ⏏ indicator in the viewfinder flashes. In this case, no other functions except for tape ejection will work.

Eject the cassette, turn off the camcorder and leave it with the cassette holder open for at least one hour in a dry place.

The camcorder can be used again if the ⏏ indicator does not appear when you insert the cassette and press one of the tape transport buttons.

On the Lens

If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off the power and do not use the camcorder for about one hour.

How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.

(1) Be sure to tightly seal the plastic bag containing the camcorder.
(2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about one hour).

Precautions

Camcorder Operation

- Operate the camcorder on 6.0 V (battery pack) or 7.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the LENS COVER switch set to CLOSE when not using the camera.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- Do not drop the camcorder.

On Handling Tapes

Do not insert anything in the small holes on the rear of the cassette. These holes are used to sense the type, thickness of tape, or if the tab is out or in, etc.

Camcorder Care

- **When the camcorder is not to be used for a long time, disconnect the power source and remove the tape.** Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth.
- Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Maintenance Information and Precautions

AC Power Adaptor

Charging

- **Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.**
- Charge the battery on a flat place without vibration.
- The battery will get hot during charging. But this is normal.

Do not continuously recharge a charged battery pack as that will cause the battery pack efficiency to deteriorate.

Charging temperature

The temperature range for charging is 41°F to 95°F (5°C to 35°C). However, to provide maximum battery efficiency, the recommended temperature range when charging is 50°F to 86°F (10°C to 30°C).

Others

- The model for USA or Canada: One blade of the plug is wider than the other for the purpose of safety and will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, contact your dealer.
- Unplug the unit from the wall outlet when not in use for a long time. To disconnect the cord (mains lead), pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if it has been dropped or damaged.
- Do not bend the AC power cord forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If it does, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- While the unit is in use, it gets hot. But this is normal.
- Do not place the unit in locations where it is;
  - Extremely hot or cold
  - Dusty or dirty
  - Very humid
  - Vibrating

If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Using Your Camcorder Abroad

Each country has its own electricity and TV color system. Before using your camcorder abroad, check the following points.

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz.
Use a commercially available AC plug adaptor **[a]**, if necessary, depending on the design of the wall outlet **[b]**.

Difference in Color System

This camcorder is an NTSC system based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV or a PAL-M system based TV with an NTSC/PAL-M transcoder.
Check the following list.

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

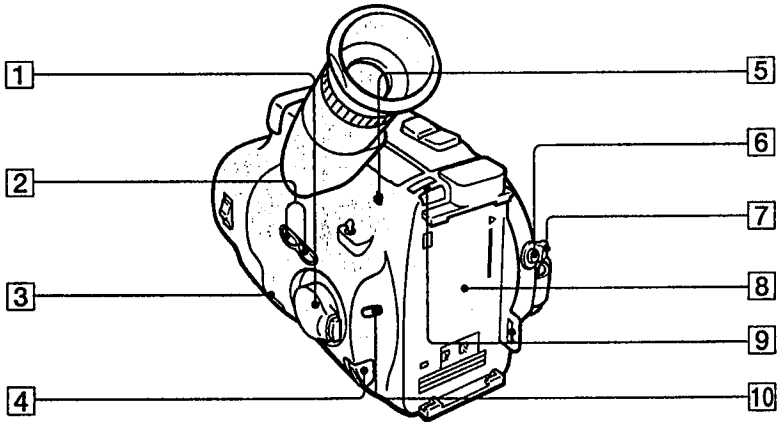
PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, former West Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

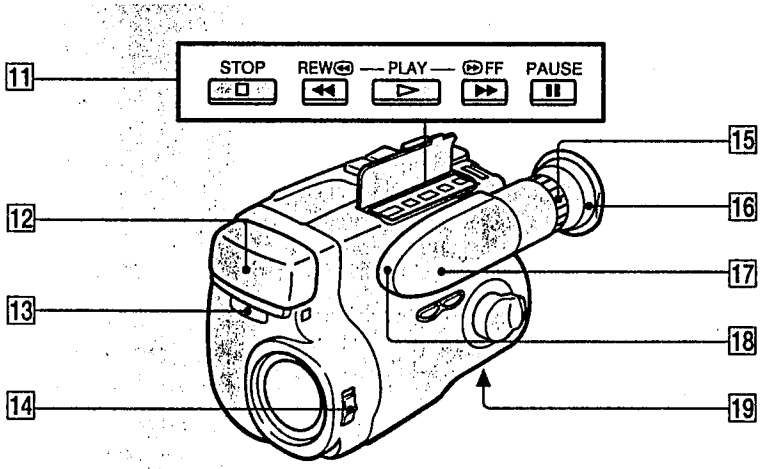
PAL-M system country
Brazil

PAL-N system countries
Argentina, Paraguay, Uruguay

SECAM system countries
Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.

Identifying the Parts





1 **POWER switch** (p. 15, 20)

2 **DATE (+) and TIME (NEXT) buttons** (p. 25)

3 **Lithium battery compartment (bottom of the camcorder)** (p. 24)

4 **BATT (battery eject) knob** (p. 8)

5 **REMOTE COMMANDER switch** (p. 37)

6 **START/STOP button** (p. 15)

7 **STANDBY switch** (p. 15)

8 **Battery mounting surface** (p. 8)

9 **Hooks for shoulder strap** (p. 38)

10 **COUNTER RESET button** (p. 16)

11 **Tape transport buttons** (p. 20)
- □ STOP
- ◀◀ REW (rewind)
- ▷ PLAY (playback)
- ▶▶ FF (advancing the tape)
- II PAUSE

12 **Built-in microphone**

13 **Remote sensor** (p. 37)
Aim the Remote Commander here for remote control.

14 **LENS COVER switch**

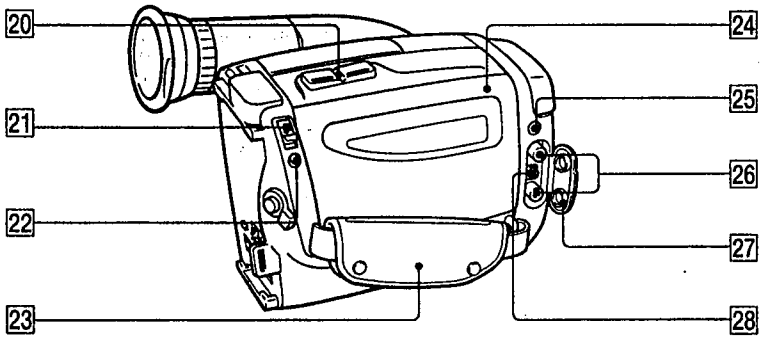
15 **Viewfinder lens adjustment ring** (p. 13)

16 **Eyecup**

17 **Viewfinder** (p. 13)

18 **Camera recording/battery lamp**

19 **Tripod receptacle** (p. 14)



20 **Power zoom button** (p. 17)

21 **EJECT knob** (p. 12)

22 **REMOTE (LANC) control jack**
(LANC) stands for Local Application Control Bus System. The (LANC) control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.

23 **Grip strap** (p. 14)

24 **Cassette holder** (p. 12)

25 **MIC jack (PLUG IN POWER)**
Connect an optional external microphone (stereo or monaural).
This jack also accepts a "plug-in-power" microphone.

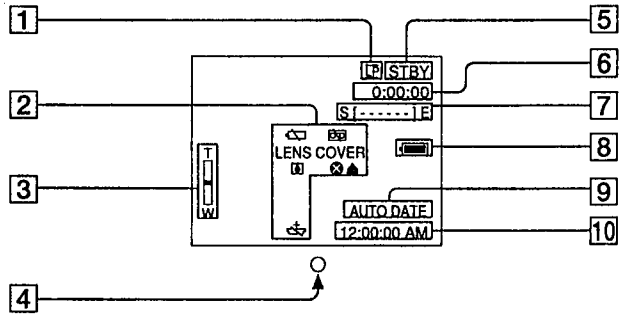
26 **Audio/Video output jacks** (p. 19)

27 **Jack cover**

28 **RFU DC OUT (RFU adaptor DC output) jack** (p. 19)

Operation Indicators

For details on each indicator, refer to the pages indicated in the parentheses.



1 Lights up when playing back a tape recorded in LP mode.

2 Warning indicators (p. 43)

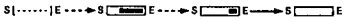
3 Power zoom indicator (p. 17)

4 Recording lamp/Battery lamp

5 Tape transport mode (p. 15)

6 Tape counter (p. 16)

7 Remaining tape length indicator



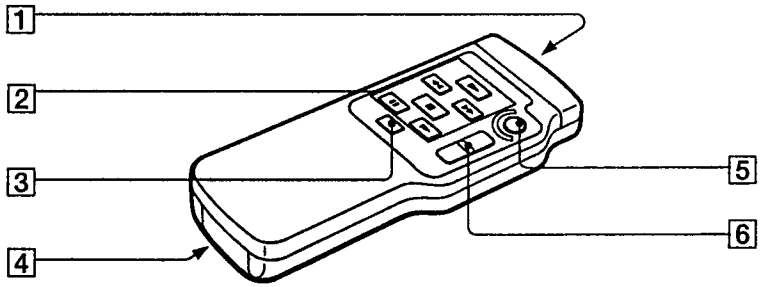
8 Remaining battery indicator (p. 9)

9 AUTO DATE indicator (p. 15)

10 Date or Time (p. 25)

Remote Commander

The buttons that have the same name on the Remote Commander and on the camcorder function identically.



1 **Transmitter**
Point toward the remote sensor to control the camcorder after turning on the POWER switch on the camcorder.

2 **Tape transport buttons**

3 **DISPLAY button**

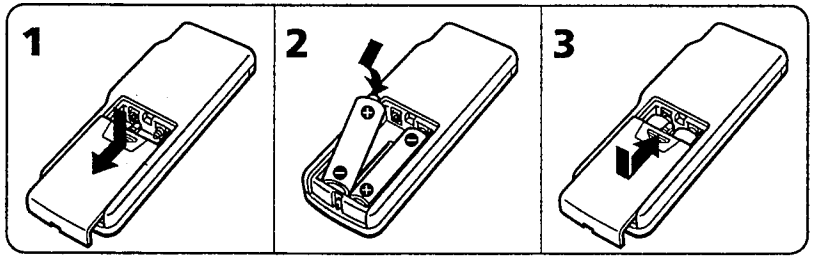
4 **Size AA (R6) battery holder**

5 **START/STOP button**

6 **Power zoom button**
The zooming speed is unchangeable in the Remote Commander.

Preparing the Remote Commander

To use the Remote Commander, you must insert two size AA (R6) batteries. Use the supplied size AA (R6) batteries.
(1) Remove the battery cover from the Remote Commander. **(2)** Insert both of the size AA (R6) batteries with correct polarity. **(3)** Put the battery cover back onto the Remote Commander.



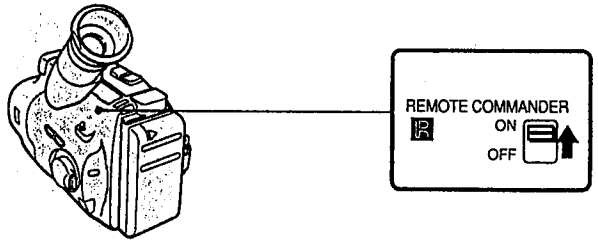
Battery Life

The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

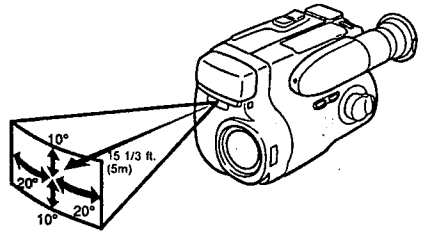
To avoid damage from possible battery leakage
Remove the batteries when you will not use the Remote Commander for a long time.

Using the Remote Commander

Make sure that the REMOTE COMMANDER switch on the camcorder is set to ON.



Remote Control Direction

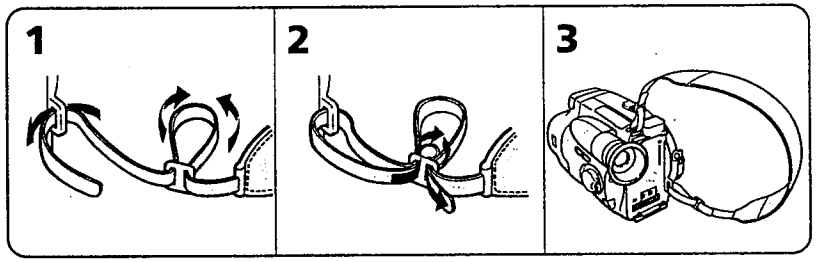


Note on the Remote Commander

- Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
- Be sure that there is no obstacle between the remote sensor and the Remote Commander.
- This camcorder works at commander mode VTR 2. The commander modes (1, 2 and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

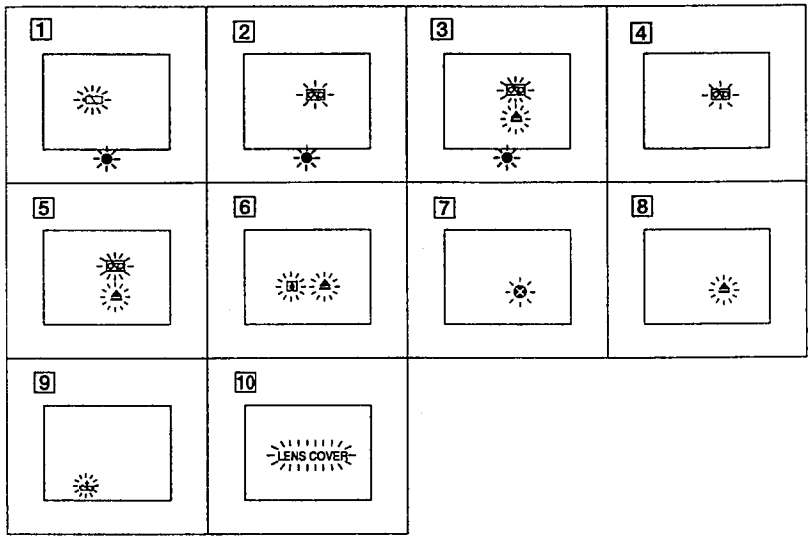
Attaching the Shoulder Strap

Attach the supplied shoulder strap to the hooks for the shoulder strap (p. 32).



Warning Indicators

If indicators flash in the viewfinder or a caution lamp on the camcorder flashes, check the following:



1 The battery is weak or dead.
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.

2 The tape is near the end.
The flashing is slow.

3 The tape has run out.
The flashing becomes rapid.

4 No tape has been inserted.

5 The tab on the tape is out (red).

6 Moisture condensation has occurred. (p. 28)

7 The video heads may be contaminated. (p. 27)

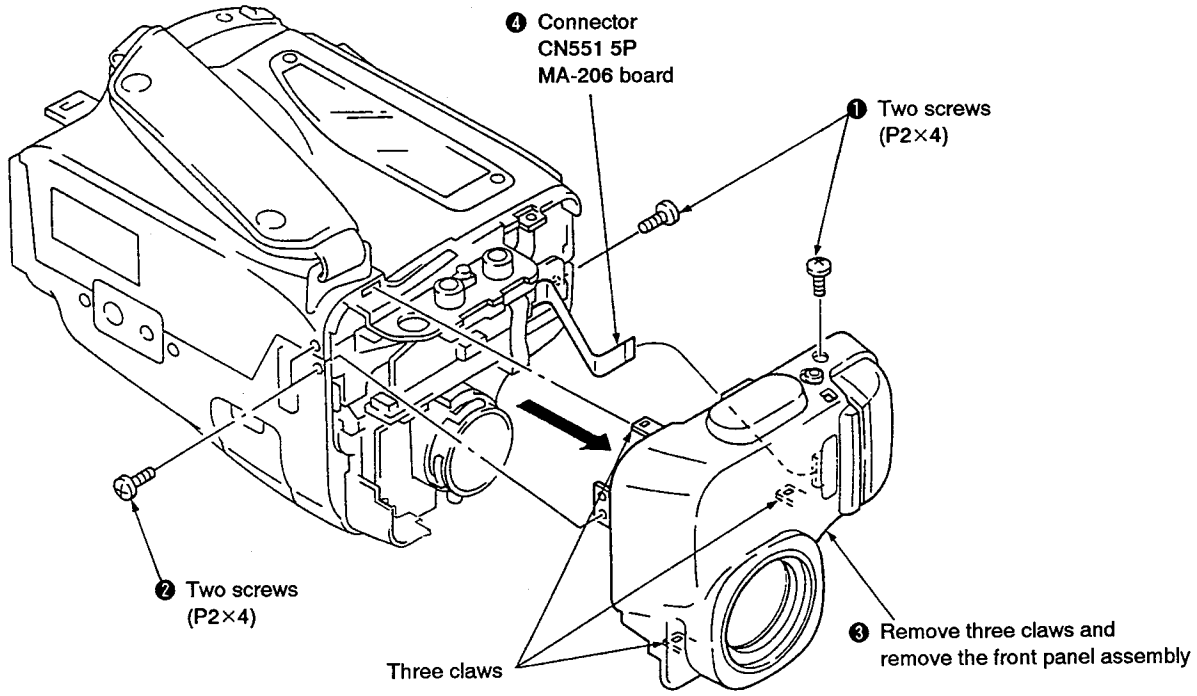
8 Some other trouble has occurred.
Disconnect the power source and contact your Sony dealer or local authorized facility.

9 The lithium battery is weak or is not installed. (p. 24)

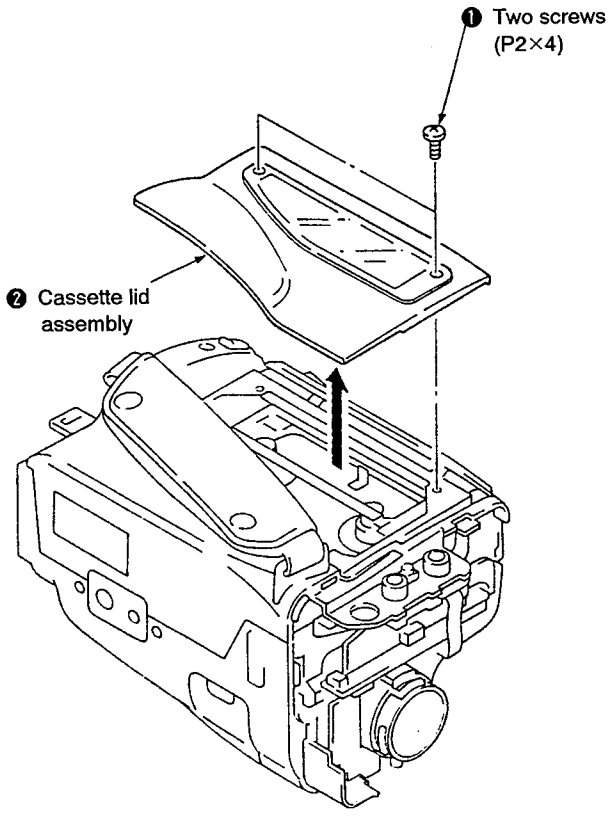
10 The LENS COVER switch is set to CLOSE.

SECTION 2
DISASSEMBLY

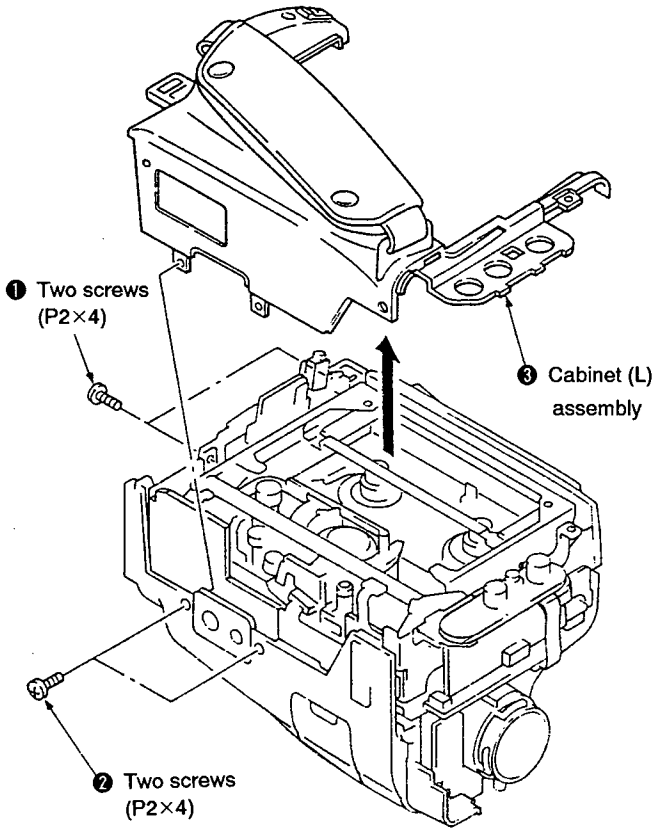
2-1. REMOVAL OF FRONT PANEL ASSEMBLY



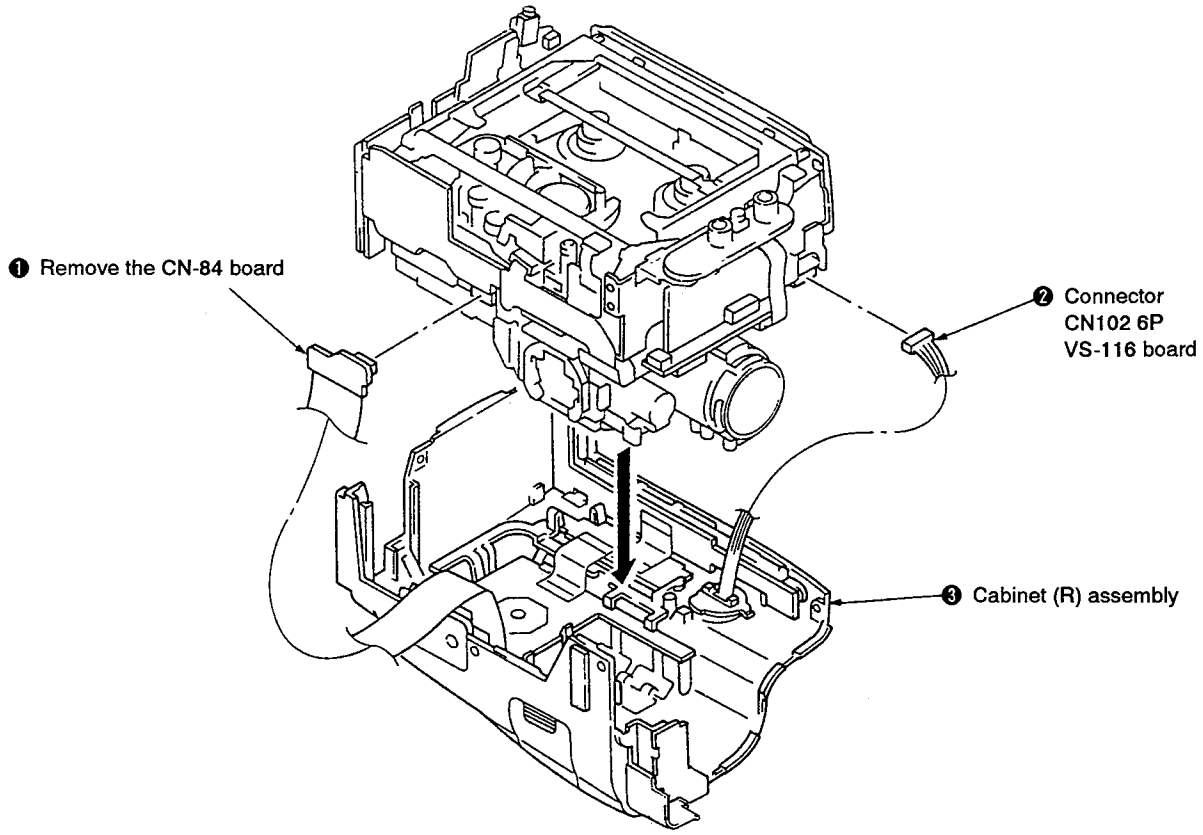
2-2. REMOVAL OF CASSETTE LID ASSEMBLY



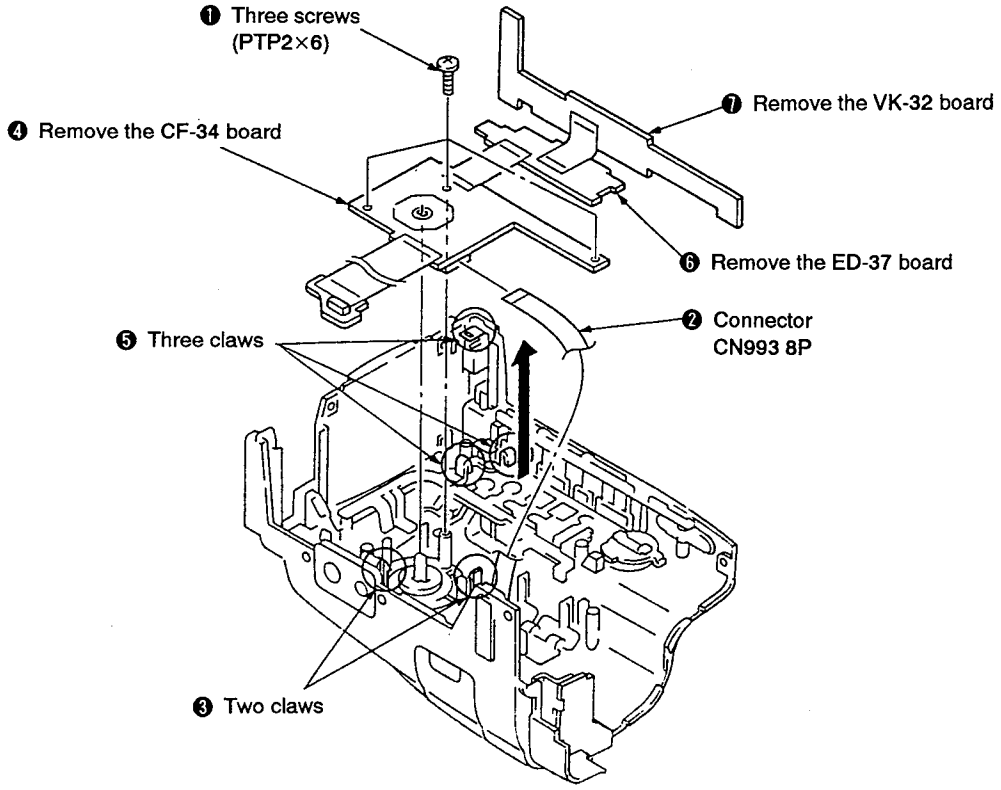
2-3. REMOVAL OF CABINET (L) ASSEMBLY



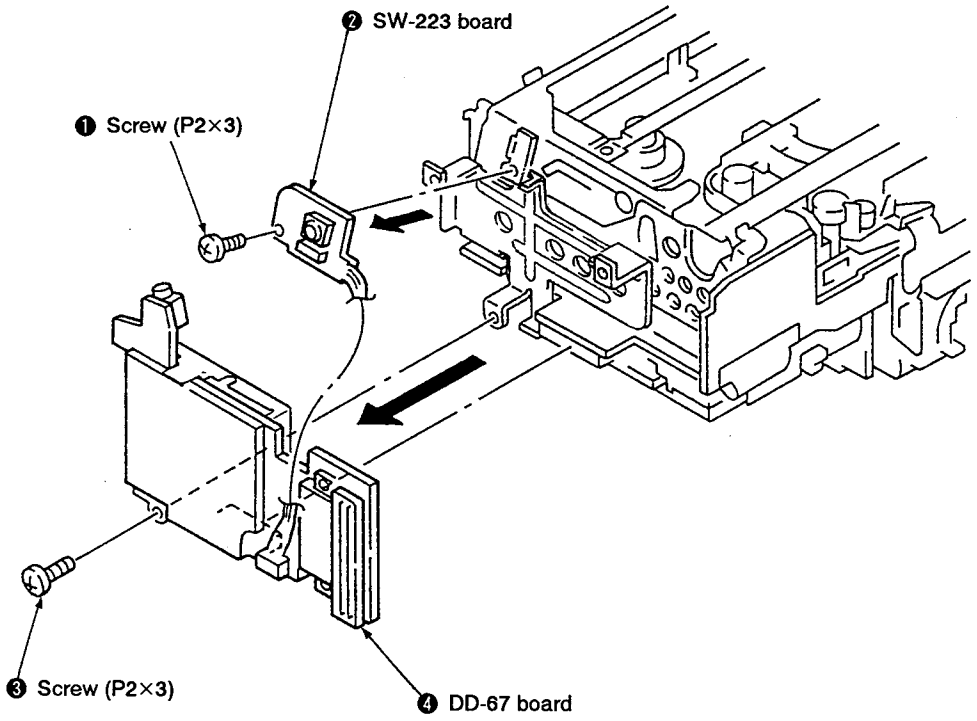
2-4. REMOVAL OF CABINET (R) ASSEMBLY



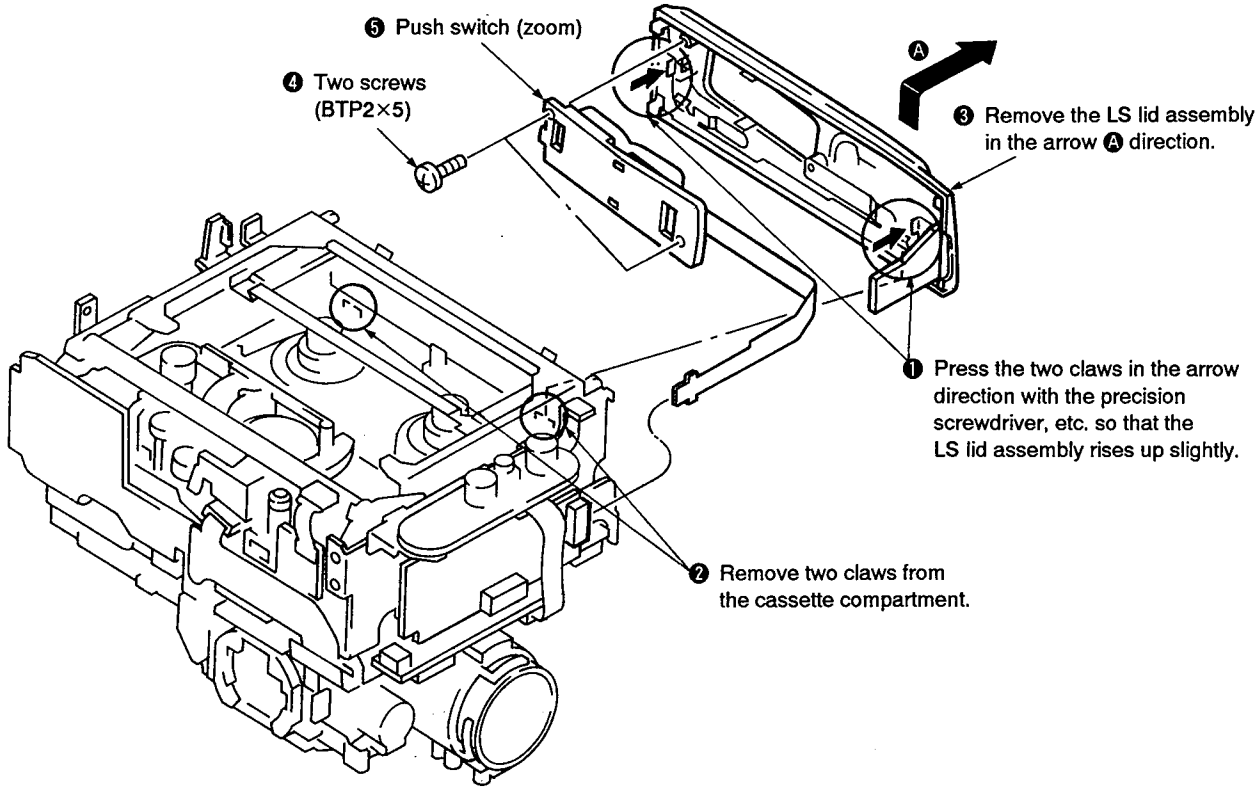
2-5. REMOVAL OF CF-34, ED-37 AND VK-32 BOARDS



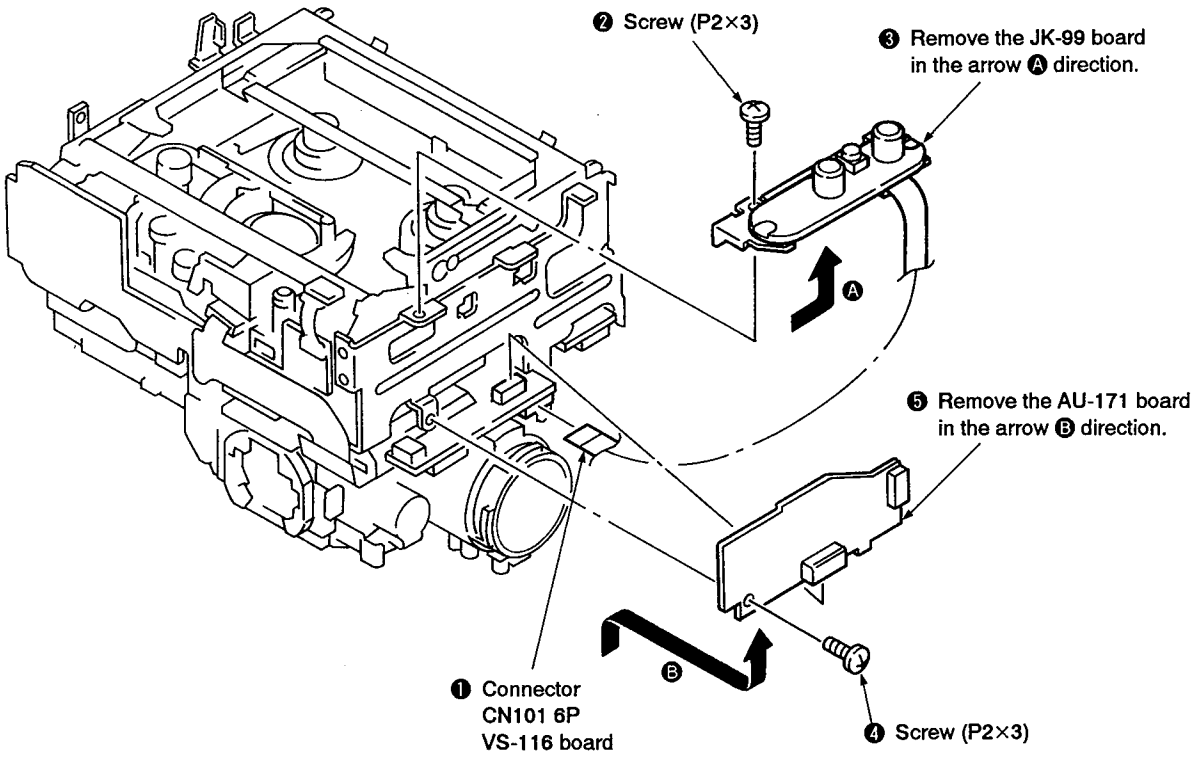
2-6. REMOVAL OF DD-67 AND SW-223 BOARDS



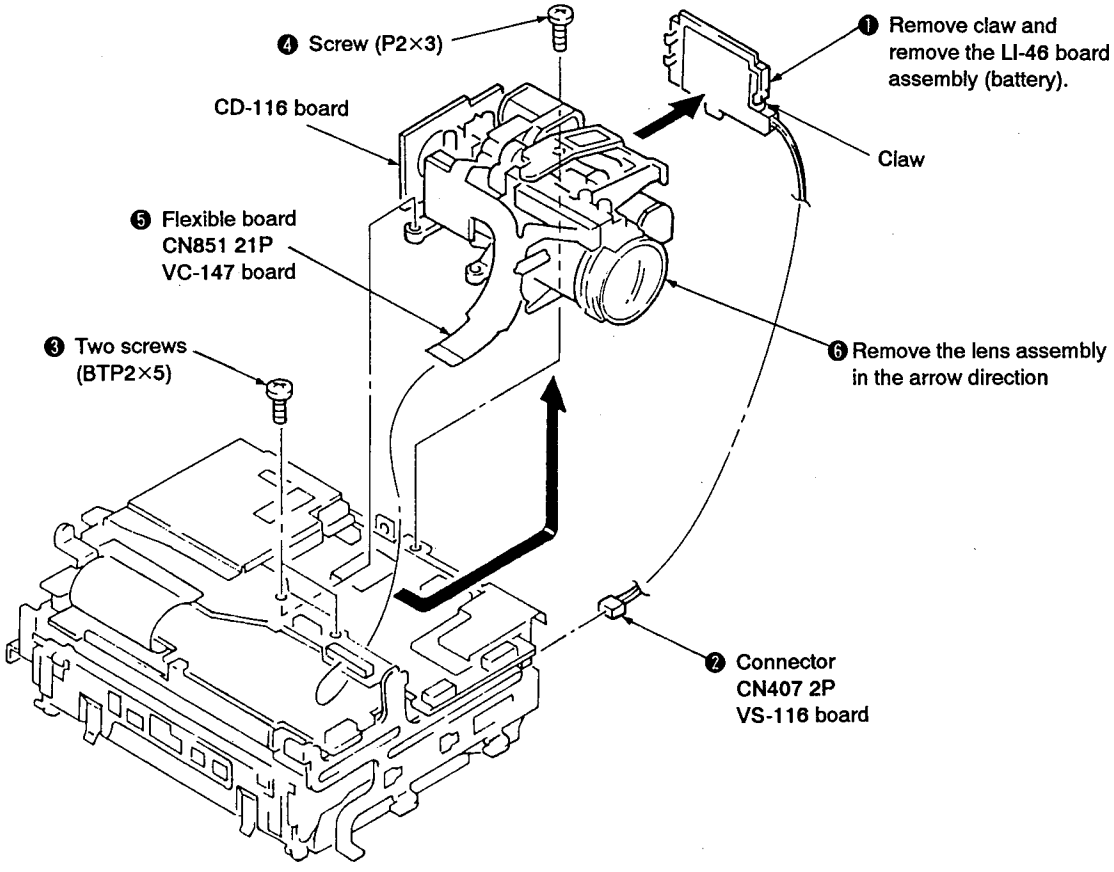
2-7. REMOVAL OF LS LID ASSEMBLY


❺ Push switch (zoom)
❹ Two screws (BTP2×5)
Ⓐ
❸ Remove the LS lid assembly in the arrow Ⓐ direction.
❶ Press the two claws in the arrow direction with the precision screwdriver, etc. so that the LS lid assembly rises up slightly.
❷ Remove two claws from the cassette compartment.

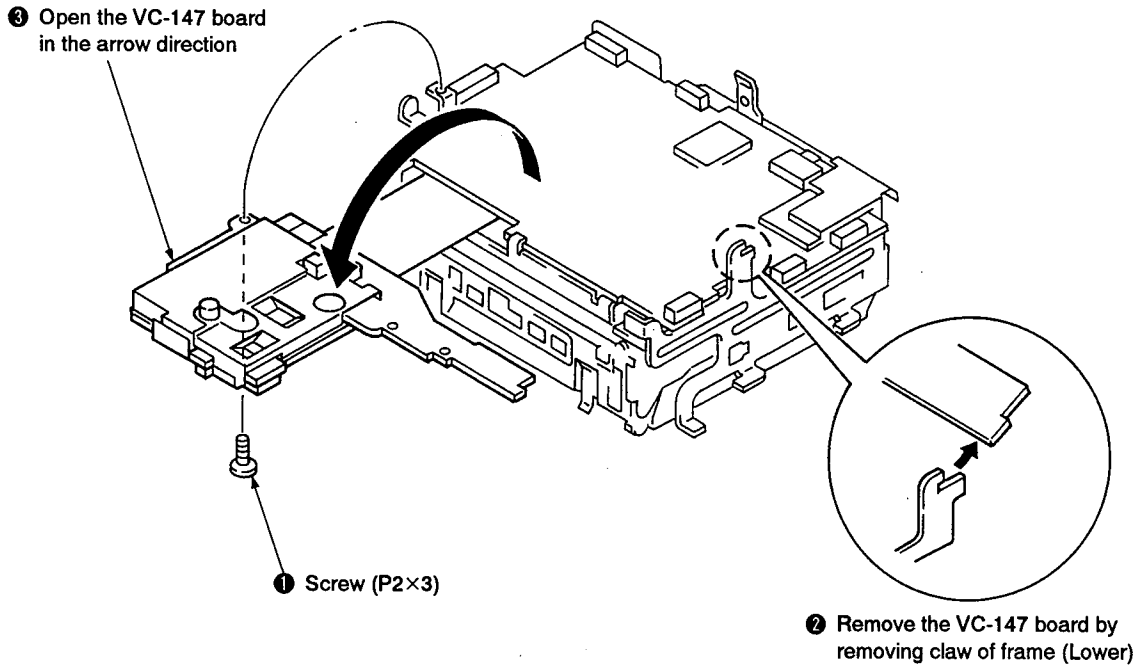
2-8. REMOVAL OF JK-99 AND AU-171 BOARDS


❷ Screw (P2×3)
❸ Remove the JK-99 board in the arrow Ⓐ direction.
Ⓐ
❺ Remove the AU-171 board in the arrow Ⓑ direction.
Ⓑ
❶ Connector CN101 6P VS-116 board
❹ Screw (P2×3)

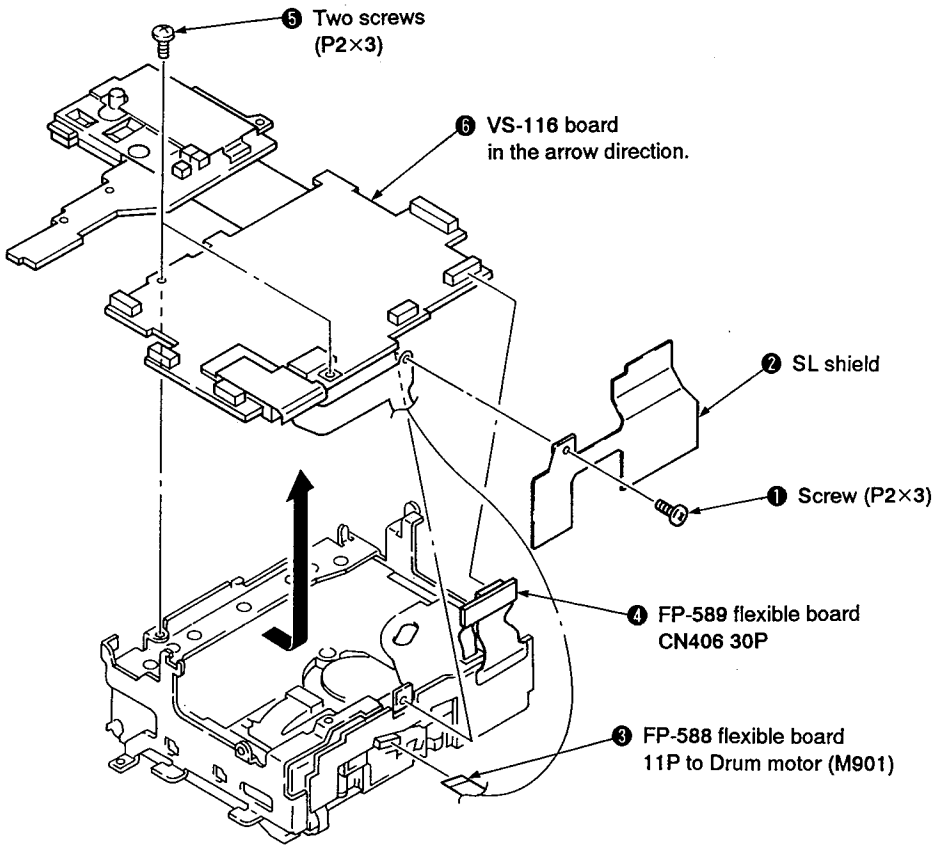
2-9. REMOVAL OF LENS ASSEMBLY (CD-116 BOARD)


❹ Screw (P2×3)
❶ Remove claw and remove the LI-46 board assembly (battery).
CD-116 board
Claw
❺ Flexible board CN851 21P VC-147 board
❸ Two screws (BTP2×5)
❻ Remove the lens assembly in the arrow direction
❷ Connector CN407 2P VS-116 board

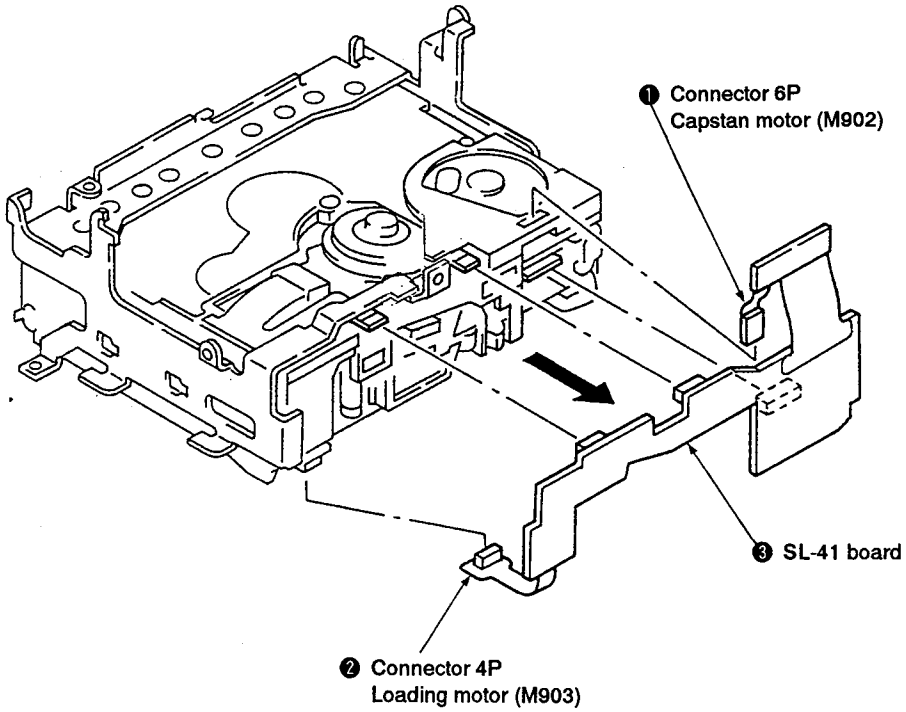
2-10. OPENING OF VC-147 BOARD



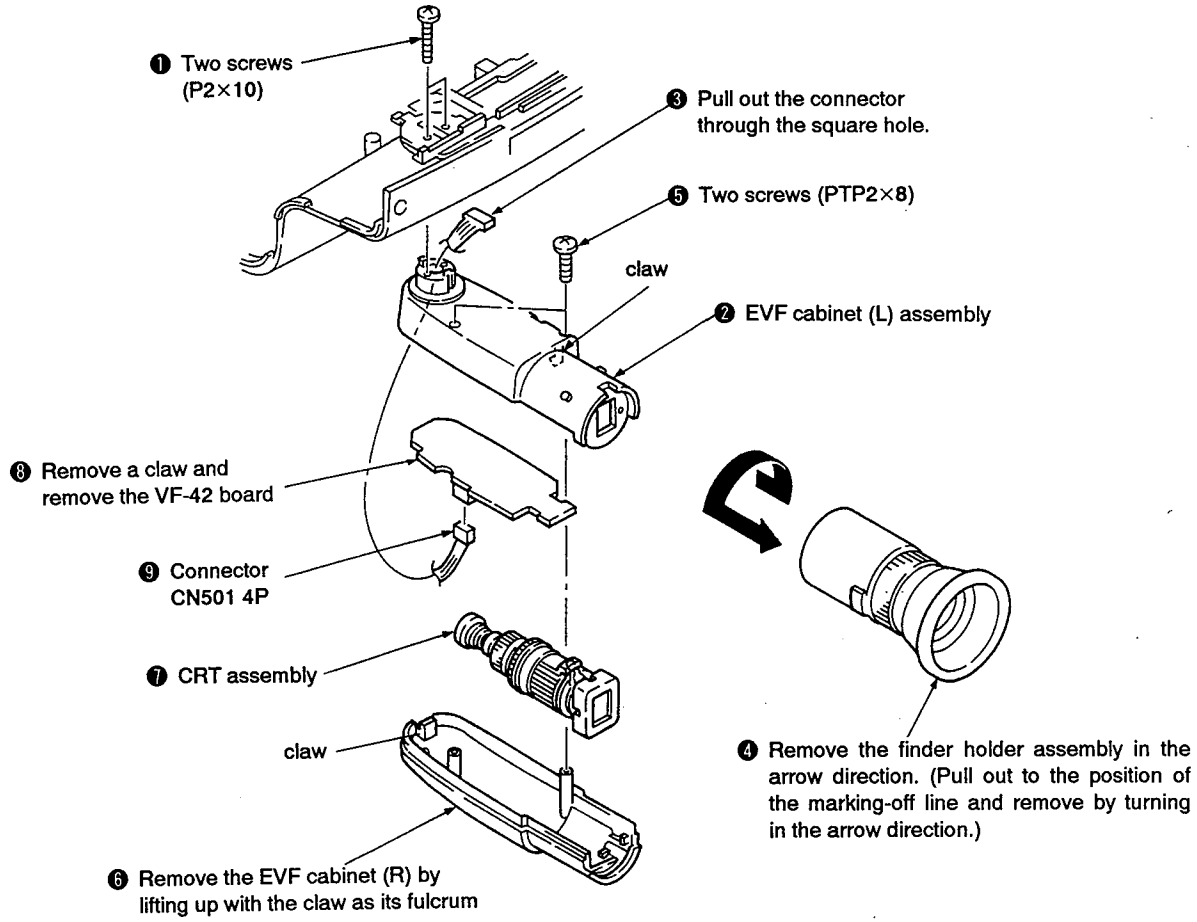
2-11. REMOVAL OF VS-116 BOARD


❺ Two screws (P2×3)
❻ VS-116 board in the arrow direction.
❷ SL shield
❶ Screw (P2×3)
❹ FP-589 flexible board CN406 30P
❸ FP-588 flexible board 11P to Drum motor (M901)

2-12. REMOVAL OF SL-41 BOARD

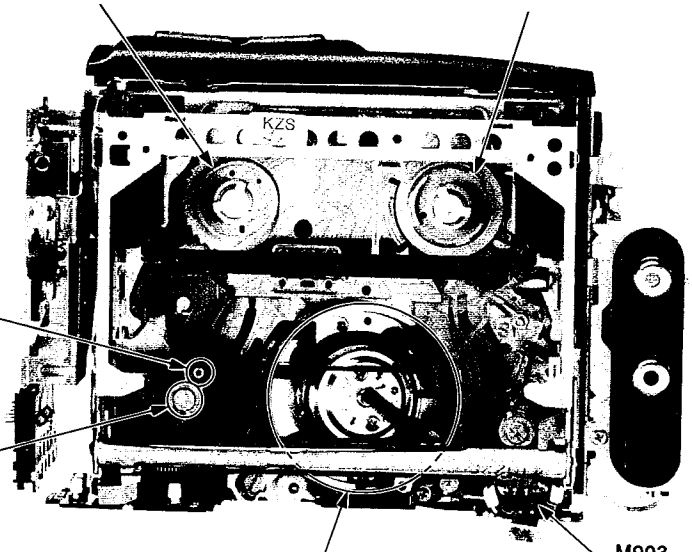


2-13. REMOVAL OF EVF ASSEMBLY (VF-42 BOARD)


❶ Two screws
(P2×10)
❸ Pull out the connector
through the square hole.
❺ Two screws (PTP2×8)
claw
❷ EVF cabinet (L) assembly
❽ Remove a claw and
remove the VF-42 board
❾ Connector
CN501 4P
❼ CRT assembly
claw
❻ Remove the EVF cabinet (R) by
lifting up with the claw as its fulcrum
❹ Remove the finder holder assembly in the
arrow direction. (Pull out to the position of
the marking-off line and remove by turning
in the arrow direction.)

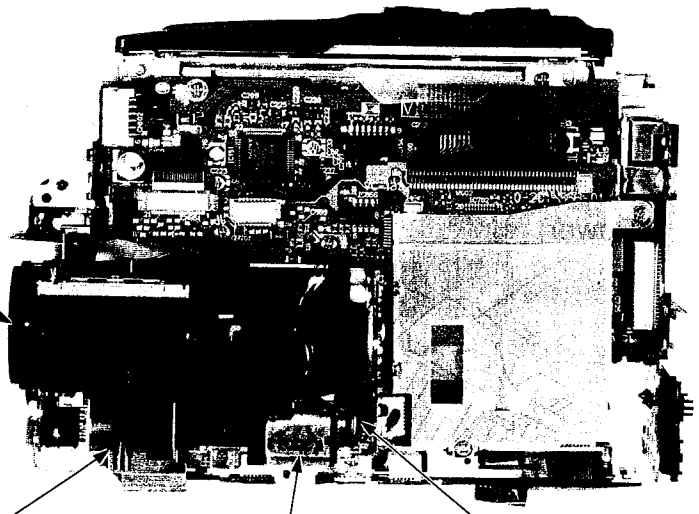
2-14. INTERNAL VIEWS

— Left side —

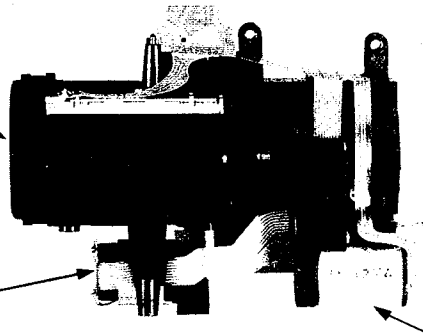


— Right side —

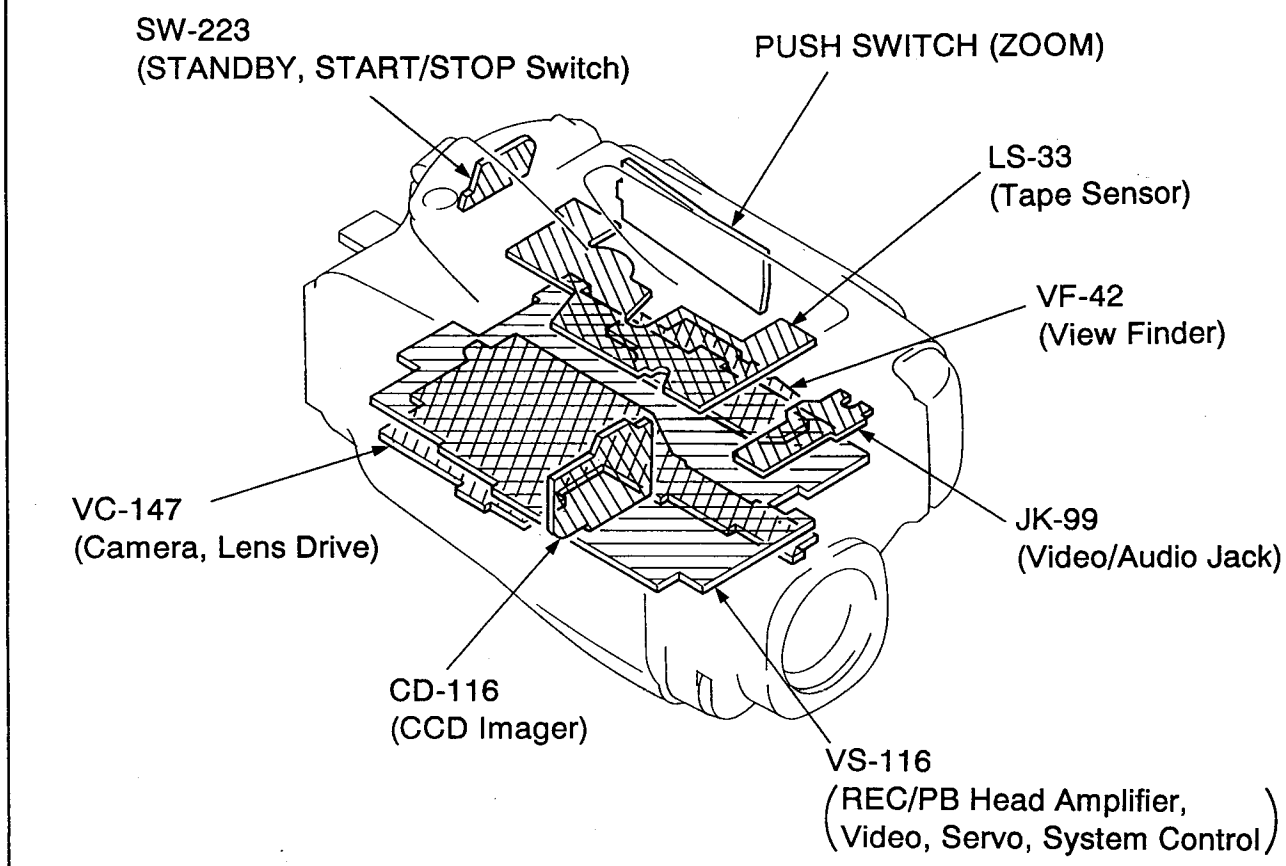
TYPE A

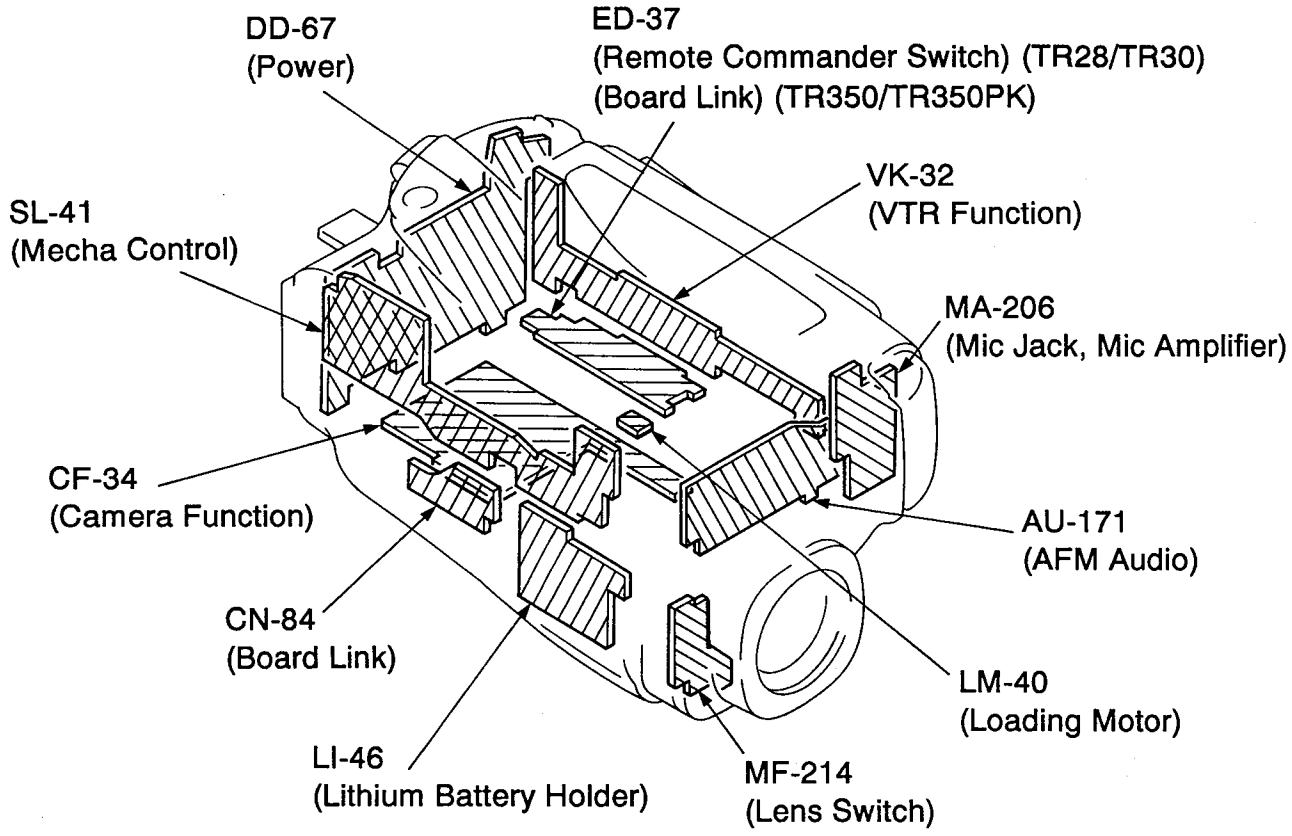


TYPE B



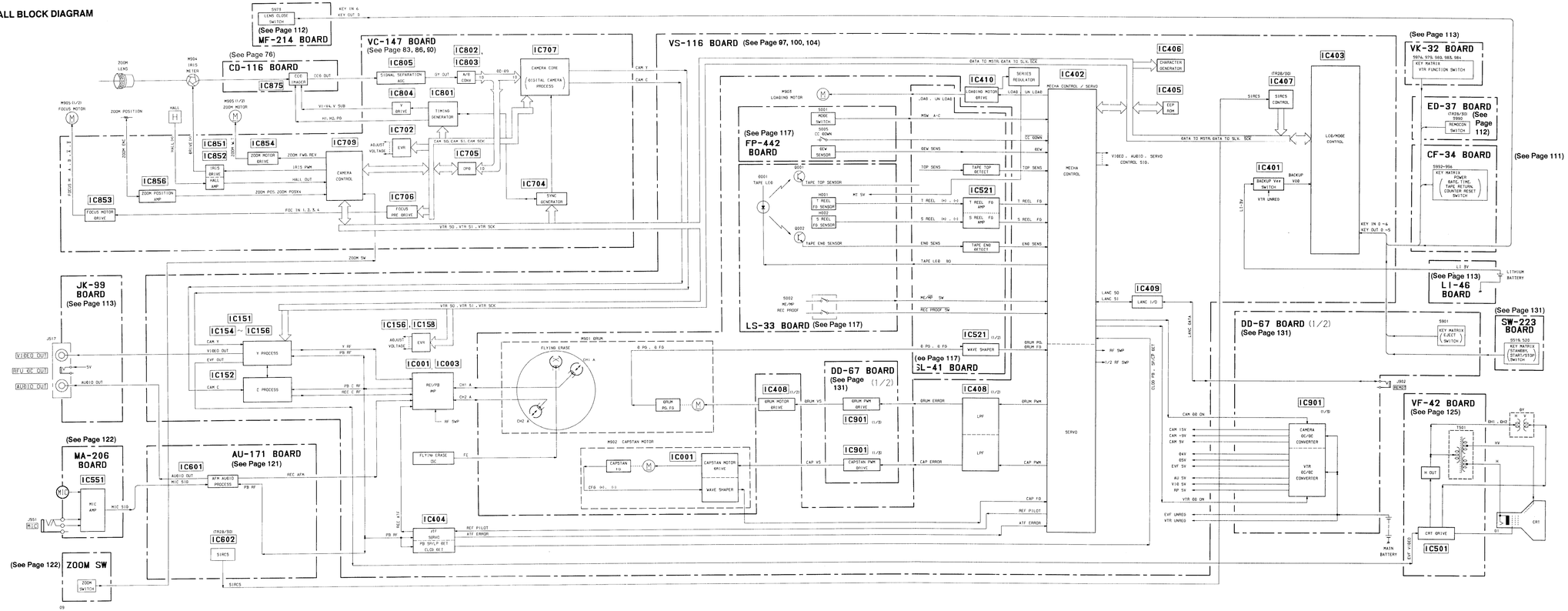
2-15. CIRCUIT BOARDS LOCATION



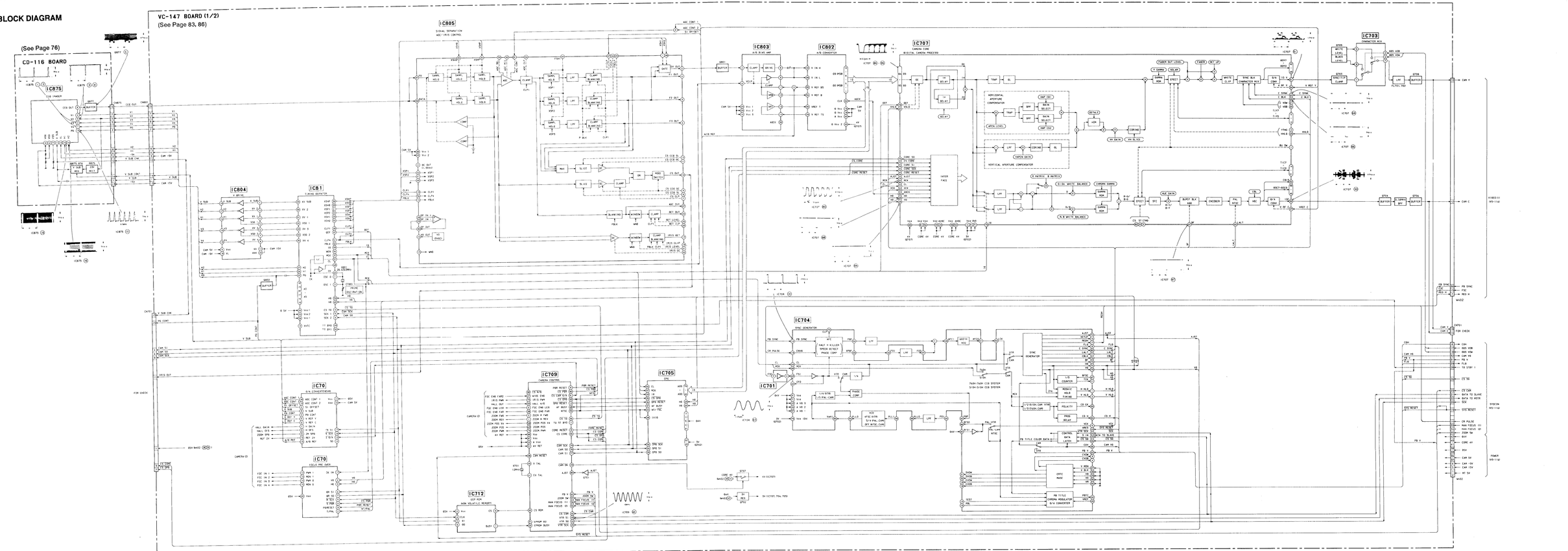


SECTION 3
BLOCK DIAGRAMS

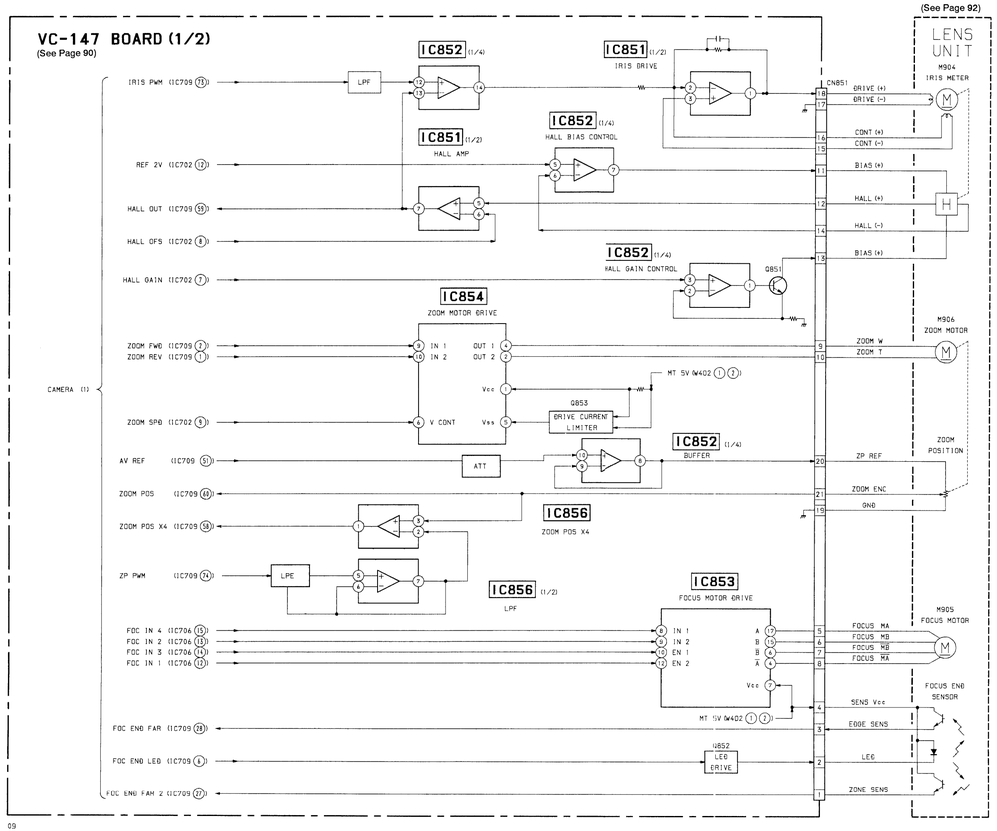
3-1. OVERALL BLOCK DIAGRAM



3-2. CAMERA (1) BLOCK DIAGRAM



3-3. CAMERA (2) BLOCK DIAGRAM



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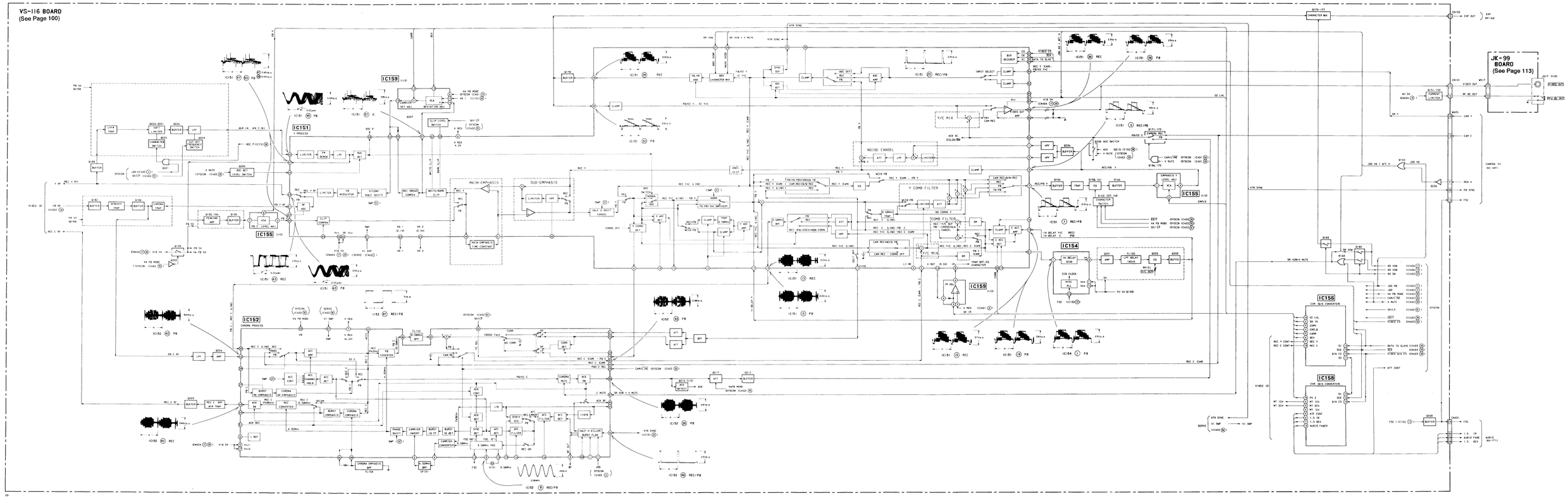
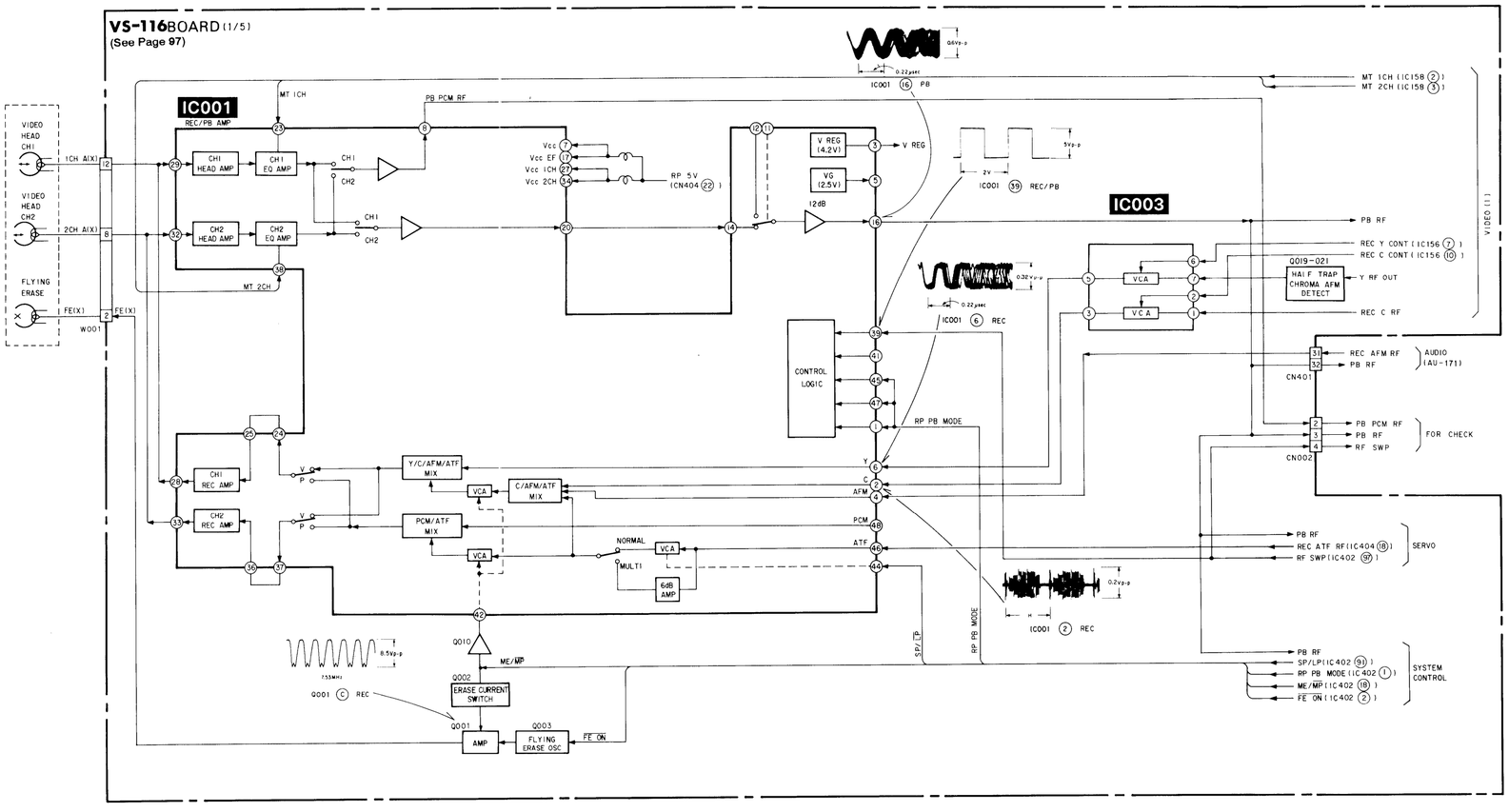
3-4. VIDEO (1) BLOCK DIAGRAM



3-5. VIDEO (2) BLOCK DIAGRAM



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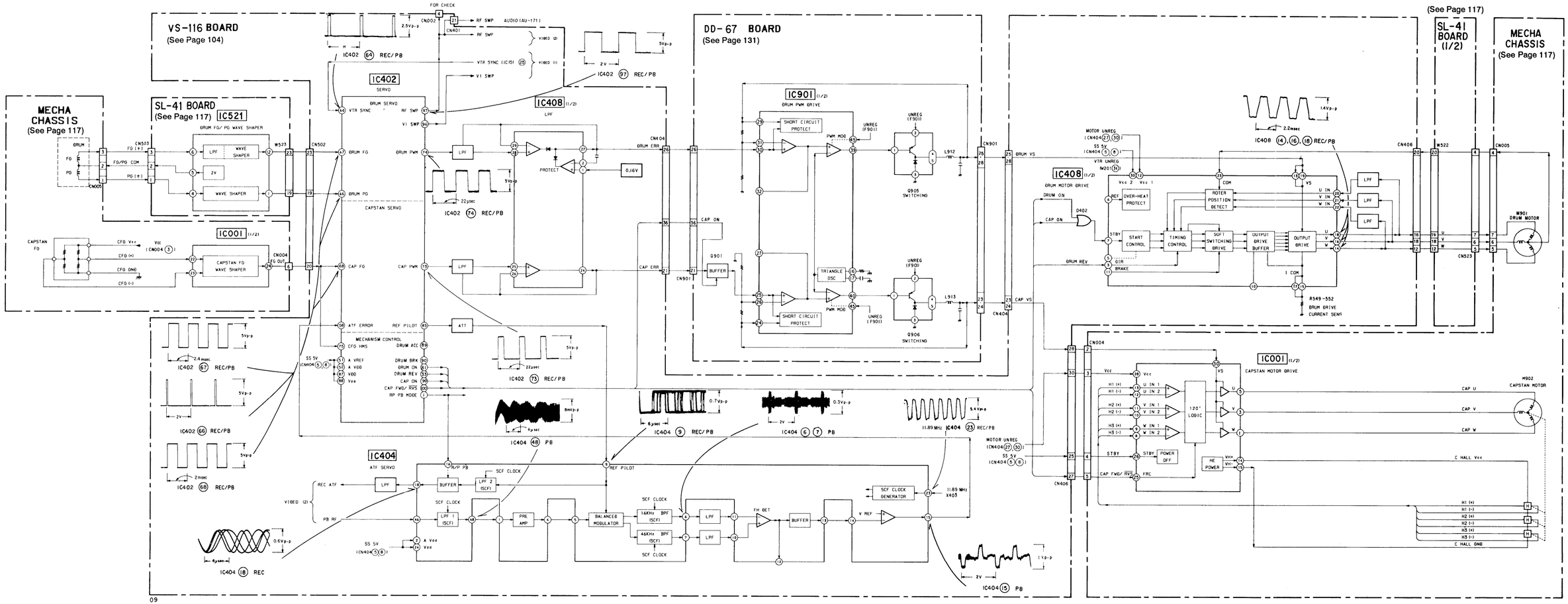
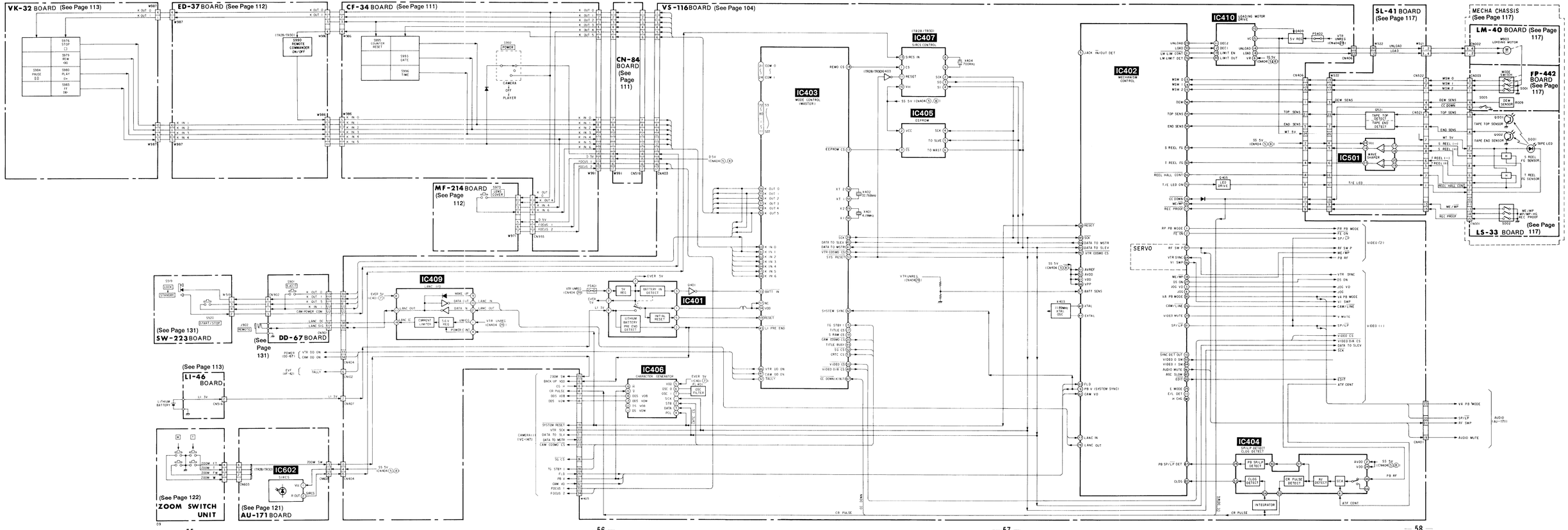
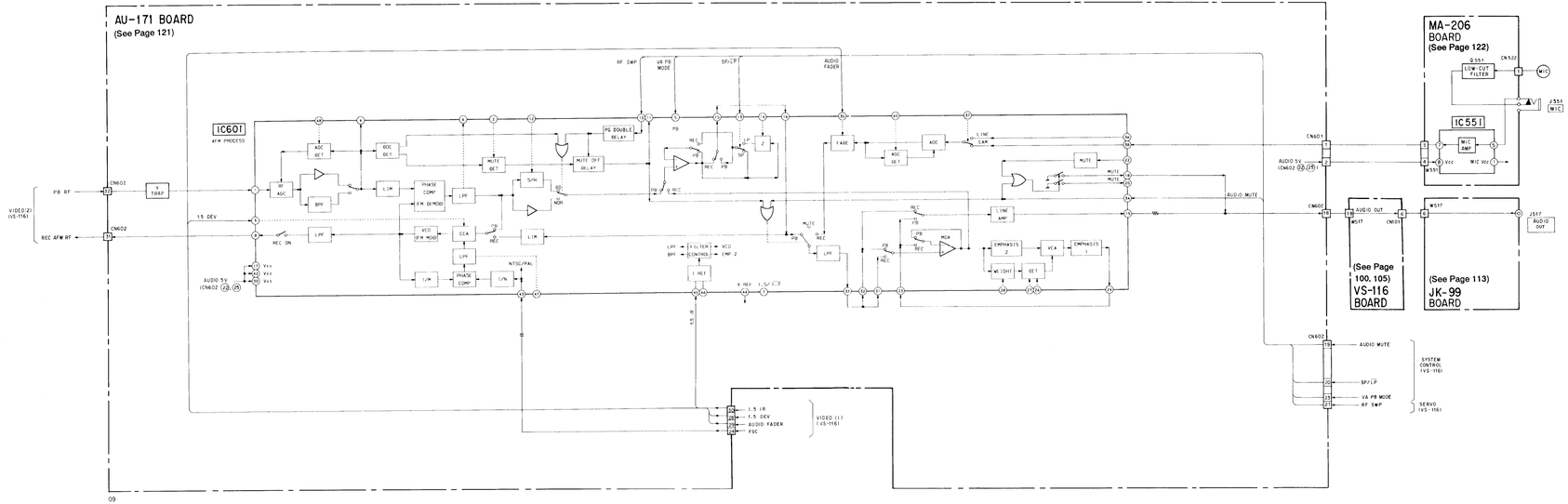
3-6. SERVO BLOCK DIAGRAM



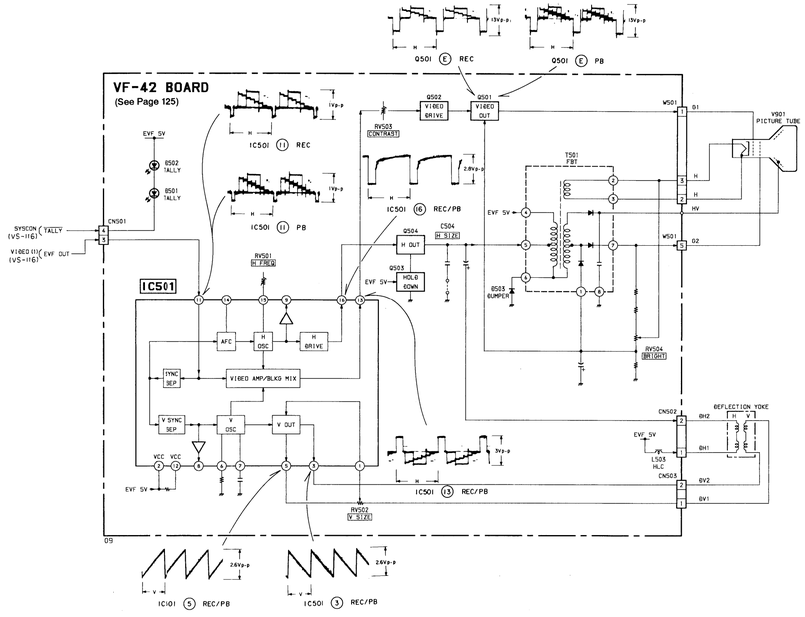
3-7. SYSTEM CONTROL BLOCK DIAGRAM


VK-32 BOARD (See Page 113)
ED-37 BOARD (See Page 112)
CF-34 BOARD (See Page 111)
VS-116 BOARD (See Page 104)
CN-84 BOARD (See Page 111)
MF-214 BOARD (See Page 112)
IC403 MODE CONTROL (MASTER)
IC407 SIRCS CONTROL
IC405 EEPROM
IC401
IC409 LANC I/O
IC406 CHARACTER GENERATOR
IC602
IC402 MECHANISM CONTROL
IC410 LOADING MOTOR DRIVE
IC501
IC404 SP/LP DETECT CLOG DETECT
SERVO
SL-41 BOARD (See Page 117)
MECHA CHASSIS (See Page 117)
LM-40 BOARD (See Page 117)
FP-442 BOARD (See Page 117)
LS-33 BOARD (See Page 117)
SW-223 BOARD (See Page 131)
DD-67 BOARD (See Page 131)
LI-46 BOARD (See Page 113)
ZOOM SWITCH UNIT (See Page 122)
AU-171 BOARD (See Page 121)

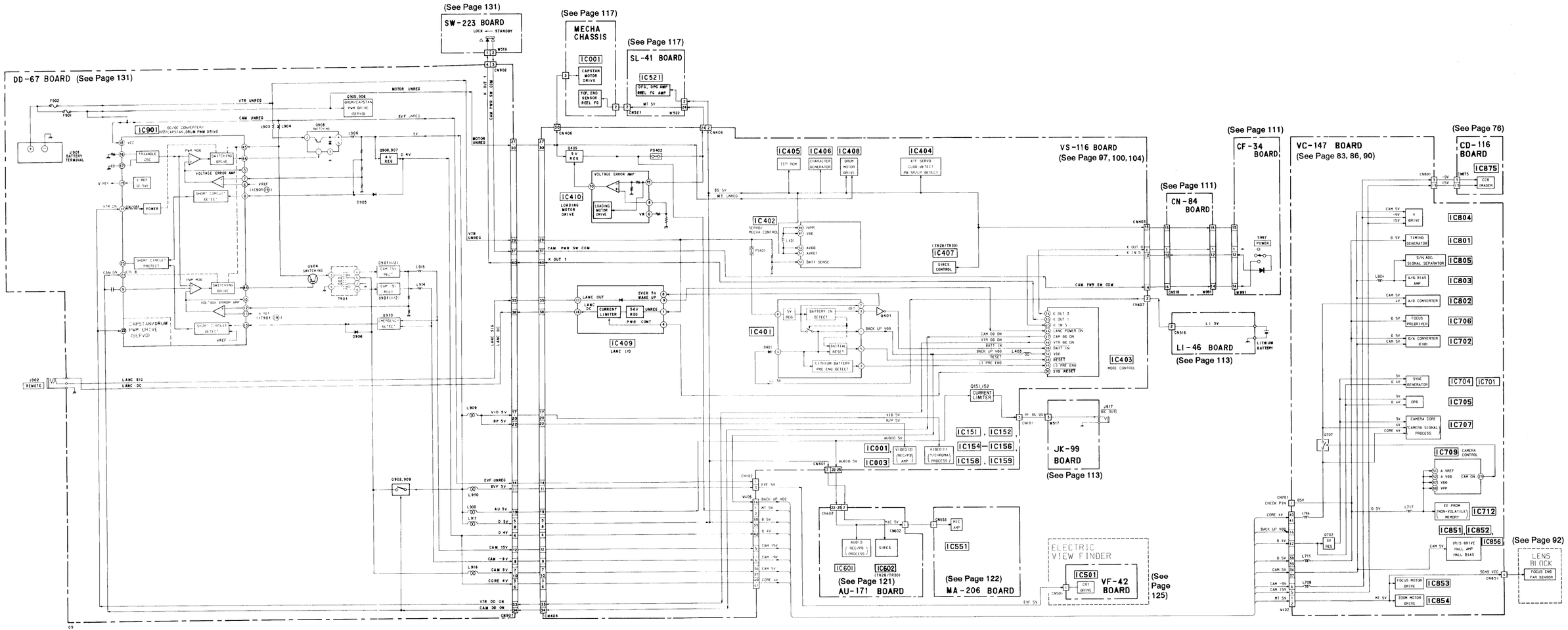
3-8. AUDIO BLOCK DIAGRAM



3-9. EVF BLOCK DIAGRAM



3-10. POWER BLOCK DIAGRAM



3-11. CAMERA MICROPROCESSOR PIN FUNCTION (IC709 ON VC-147 BOARD: CXP80624-434R)

Pin No.	Signal	I/O	Function
1	ZOOM M REV	O	Zoom motor control signal. Normally "L". 15.7 msec period PWM signal when rotating to WIDE. "H" when rotating to TELE.
2	ZOOM M FWD	O	Zoom motor control signal. Normally "L". 15.7 msec period PWM signal when rotating to TELE. "H" when rotating to WIDE.
3			Not used.
4			
5			
6	FOC END LED	O	Focus end sensor LED control signal. Normally "L".
7	RT05/D5		Not used.
8	CORE RESET	O	Camera core (IC707 on VC-147 board) reset signal. Normally "H". "L" when reset.
9	PDR RESET	O	Focus predriver (IC706 on VC-147 board) reset signal. Normally "H". "L" when reset.
10			Not used.
11	TG STBY0		
12	OPD RESET	O	OPD (IC705 on VC-147 board) reset signal. "H": camera mode. "L": VTR mode.
13			Not used.
14			
15			
16			
17			
18			
19			
20			
21	EPROM DO	O	Connected to +5V.
22	EPROM BUSY	I	BUSY signal from EEPROM. Normally "H". "L" pulse when data reading/writing.
23			Not used.
24			
25			Connected to +5V.
26			
27	WIDE END		Focus Zone sensor input. Normally "L".
28	FOC END FAR	I	Focus edge sensor input. Normally "L".
29	CAM ON	O	Power supply control signal. Normally "L".
30			Not used.
31			
32			
33			
34			
35			
36			
37	MP		Connected to GND.
38	CAM RESET	I	Reset signal input. Normally "H". "L" when reset.
39	VSS		GND
40	XTAL	O	12 MHz clock oscillation circuit.
41	EXTAL	I	
42	CS CAM	I	Chip select signal from mode control microprocessor. (IC403 on VS-116 board)
43	VTR SI	I	Serial data input from mode control microprocessor.
44	VTR SO	O	Serial data output from mode control microprocessor.
45	VTR SCK	I	Serial data transfer clock.
46			Not used.
47			
48			

Pin No.	Signal	I/O	Function
49			Not used.
50	AVSS		GND
51	AVREF		Analog input port reference voltage (5V).
52	AVDD		Analog input port voltage (5V).
53			Connected to GND.
54			
55	MAN FOCUS (2)	I	Not used.
56	MAN FOCUS (1)	I	
57	ZOOM SW	I	Zoom key input. 0.4V: F-TELE, 1.4V: TELE and 3.7V: F. WIDE, 2.5V: WIDE and 5V: no input.
58	ZOOM POS X4	I	Zoom position voltage. approx. 0.4V (WIDE end) to approx. 2.8V (TELE end).
59	HALL A/D	I	Hall voltage. approx. 1V (iris open) to approx. 3V (iris close).
60	ZOOM POS	I	Zoom position voltage. approx. 0.2V (WIDE end) to approx. 2.4V (TELE end).
61			Connected to 5V.
62	PB V	I	VD signal input from mecha controler (IC402 on VS-116 board).
63	PG5/SYNC1		Connected to +5V.
64	VTR SYNC		
65	PB CTL		
66	DPG		
67			
68	AF BUSY	I	AF busy signal.
69			Not used.
70			
71			
72			
73	IRIS PWM	O	Iris control signal. 21 µsec period PWM signal.
74	ZM PWM	O	Zoom position detection voltage output. 21 µsec period PWM signal.
75			Not used.
76			
77	CAM SI	I	Serial data input.
78	CAM SO	O	Serial data output.
79	CAM SCK	O	Serial data transfer clock.
80	AJST	I	Adjustment timing pulse input. Normally "H".
81	PI/TO		Not used.
82	PI/PWM		
83	PI/PO		
84	PI O		Connected to +5V.
85	PKO		
86	GND		GND
87	VDD		+5V power supply.
88	VPP		
89			Not used.
90	CS PDR	O	Chip select signal to focus predriver (IC706 on VC-147 board).
91	CS CAM D/A	O	Chip select signal to camera EVR (IC702 on VC-147 board).
92	CS ROM	O	Chip select signal to EEPROM (IC712 on VC-147 board).
93	CS OPD	O	Chip select signal to OPD (IC705 on VC-147 board).
94	NTSC	O	NTSC: "L", PAL: "H".
95	CS CORE	O	Chip select signal to camera core (IC707 on VC-147 board).
96	CS TG	O	Chip select signal to timing generator (IC801 on VC-147 board).
97			Not used.
98	CS A/D	O	Chip select signal to Zoom position A/D converter. Not used.
99			Not used.
100			

3-12. MECHANISM CONTROL MICROPROCESSOR PIN FUNCTION (IC402 ON VS-116 BOARD: CXP80624-416R)

Pin No.	Port Name	Signal	I/O	Connection	Function
1	PB3/PP011	RP PB MODE	O	RP	REC/PB select signal of REC/PB amplifier (IC001 on VS-116 board) and ATF servo IC (IC404 on VS-116 board). "H": PB.
2	PB2/PP010	FE ON	O	RP	Flying erase oscillation ON/OFF control signal. "L": oscillation.
3	PB1/PP09	JOG VD	O	VA	False VD signal to be inserted into playback video signal during variable speed playback.
4	PB0/PP08	JOG	O	VA	Variable speed/normal speed playback select signal of video circuit. "H" when variable speed playback.
5	PC7/RT07	JACK IN/OUT	I	VA	Not used. Connected to +5V.
6	PC6/RT06	1.7M DET	I	VA	Not used.
7	PC5/RT05	JACK MONO/STE DET	I	VA	
8	PC4/RT04	INT VD	I		
9	PC3/RT03	PB V (SYSTEM SYNC)	O	MODE CON	V sync for mode controller.
10	PC2/RT018	SYNC DET OUT	O	VA	Sync detect output. "L" when Sync is detected.
11	PC1/RT017	E/L DET	I	VA	Not used.
12	PC0/RT016	MIC MONO/ST DET	I	AU	
13	PJ7	M SW 0	I	MD	Mode switch input.
14	PJ6	M SW 1	I	MD	
15	PJ5	M SW 2	I	MD	
16	PJ4	CC DOWN	I	MD	Cassette compartment down switch input. "L": down.
17	PJ3	REC PROOF	I	MD	Erasure protection switch input. "L" when REC prohibit.
18	PJ2	ME/MP	I	MD	ME/MP switch input. "L": MP, "H": ME.
19	PJ1	HG/NOR	I	MD	Connected to GND.
20	PJ0	VIDEO MUTE	O	VA	Video output mute signal. "H": mute.
21	PD7	LINE MIX	I	VA	Not used.
22	PD6	MAT SEL 1	I	VA	
23	PD5	MAT SEL 2	I	VA	
24	PD4	MAT ON/OFF	O	VA	
25	PD3	E MODE	O	VA	
26	PD2	CAM/LINE	O	VA	Camera input/line input select signal. "H" when camera input.
27	PD1	DS ON	O	VA	Data screen ON/OFF signal. "H": ON.
28	PD0	EDIT	O	VA	Video circuit EDIT/NORMAL switch signal. "L": EDIT.
29	PH7	UNLOAD	O	SS	Loading motor control signal. "H" or "H" pulse when unloading.
30	PH6	LOAD	O	SS	Loading motor control signal. "H" or "H" pulse when loading.
31	PH5	LM LIM COM	O	SS	Loading motor limiter control signal. Temporary "H" when loading.
32	PH4	COMP REC	O	VA	Not used.
33	PH3	DRUM REV	O	SS	Drum rotating control signal . Normally "L".
34	PH2		O		N.C.
35	PH1		O		
36	PH0	REEL HALL CONT	O	SS	Reel FG sensor (HALL element) power supply control signal.
37	MP	MP			Connected to GND.
38	RST	RESET	I	MODE CON	Reset signal from mode control microprocessor. "L" when reset.
39	VSS	VSS			GND
40	XTAL	XTAL	I	SS	11.89 MHz clock oscillation circuit.
41	EXTAL	EXTAL	O	SS	
42	CSO	VTR COSMO CS	I	MODE CON	Chip select signal from mode control microprocessor (VS-116 board IC403)
43	S10	DATA TO SLVE	I	MODE CON	Serial data input from mode control microprocessor.
44	S00	DATA TO MSTR	O	MODE CON	Serial data output to mode control microprocessor.
45	SCKO	SCK	I	MODE CON	Serial clock input from mode control microprocessor.

Mode switch input:

	BL	END	EJECT	USE	LOAD	READY	TURN	REC/PB	FF
M SW 0	L	L	L	H	L	H	H	L	L
M SW 1	L	H	L	L	L	L	H	H	L
M SW 2	L	H	H	H	H	L	L	L	L

Pin No.	Port Name	Signal	I/O	Connection	Function
46	PF7/AN11	AUDIO MUTE	O	VA	Audio output mute signal. "H": mute.
47	PF6/AN10	1.7M OFF	O	VA	Not used.
48	PF5/AN9	GND	I		GND
49	PF4/AN8	GND	I		
50	AVSS	AVSS			Analog port GND.
51	AVREF	AVREF			Analog port reference voltage. Connected to +5V.
52	AVDD	VDD			Analog port power supply (5V).
53	PF3/AN7	N.C.			Connected to GND.
54	PF2/AN6	END SENS	I	SS	Tape end detection signal. Normally "L", "H" pulse: tape end.
55	PF1/AN5	TOP SENS	I	SS	Tape top detection signal. Normally "L", "H" pulse: tape top.
56	PF0/AN4	DEW	I	SS	Dew condensation detection signal. "L" when dew condensation.
57	AN3	BATT SENSE	I	SS	Battery voltage input for battery end detection. 1/2 divided by RB401.
58	AN2	ATF ERROR	I	SS	ATF error, ATF lock error input.
59	AN1	S REEL FG	I	SS	S reel FG signal input.
60	AN0	T REEL FG	I	SS	T reel FG signal input.
61	PG7/EXI1	PG7 (N.C.)			Connected to GND.
62	PG6/EXI0	CAM VD	I	CAM SG	VD signal from camera circuit sync generator. V period pulse.
63	PG5/SYNC1	FLD	I	CAM SG	FIELD signal from camera circuit sync generator. 2V period pulse.
64	PG4/SYNC0	VTR SYNC	I	VA	Composite sync signal separated from REC/PB Y signal.
65	PG3/PBCTL	PB SP/LP DET	I	SS	Discriminates PB tape REC mode when CUE/REVIEW/FF and REW. "L": LP.
66	PG2/DPG	DRUM PG	I	SS	Drum PG signal input. For drum phase servo 33.3 msec period "H" pulse.
67	PG1/DFG	DRUM FG	I	SS	Drum FG signal input. For drum speed servo 2.8 msec period pulse.
68	PG0/CFG	CAP FG	I	MD	Capstan FG signal input. For capstan speed servo. Approx. 994 Hz when REC/PB (SP).
69	PE7/DAB0	N.C.	O		N.C.
70	PE6/DAB0	T/E LED ON	O	SS	Tape LED ON/OFF signal. 100 msec period "H" pulse when REC/PB.
71	PE5/DAA1	N.C.	O		N.C.
72	PE4/DAA0	N.C.	O		
73	PE3/PWM1	CAP PWM	O	SS	Capstan error signal output 20.15 µsec PWM signal.
74	PE2/PWM0	DRUM PWM	O	SS	Drum error signal output 20.15 µsec PWM signal.
75	PE1/EC/INT2	C FG	I	MD	Capstan FG signal input. For tape counter.
76	PE0/INT0	S JACK IN			Not used, connected to +5V.
77	P17/ST1	LANC IN	I	SS	Control L serial data input.
78	P16/SO1	LANC OUT	O	SS	Control L serial data output.
79	P15/SCK1	LM LIMIT DET	I	SS	Loading motor limiter ON detection signal. Normally "H", "L" when limiter ON.
80	P14/INT1	AGC SLOW			Not used.
81	P13/TO	DRUM ON	O	SS	Drum driver ON/OFF control signal. "H" when drum ON.
82	P12/PWM	CLOG	O	SS	Head clog detection signal. "L" when no trouble.
83	P11/PO	REF PILOT	O	SS	ATF servo reference pilot signal. Synchronized when drum rotation to output by selecting four frequencies. f1=102.52 kHz, f2=118.95 kHz, f3=165.21 kHz and f4=148.69 kHz.
84	P10/PCK				Connected to +5V.
85	PKO	13/10 SW	I	MD	Not used.
86	VSS	VSS			GND
87	VDD	VDD			VDD
88	N.C.	(VPP)			Connected to +5V.
89	PA7/PP07	DRUM ACC	O	SS	Drum motor acceleration signal. Not used.

Pin No.	Port Name	Signal	I/O	Connection	Function
90	PA6/PP06	DRUM BRK	O	SS	Drum motor brake signal. Normally "L".
91	PA5/PP05	SP/LP	O	VA	SP/LP select signal. "L": LP.
92	PA4/PP04	AU IN/OUT	O		Not used.
93	PA3/PP03	VIDEO O SW	O	VA	VIDEO OUT inhibit signal. "H": inhibit.
94	PA2/PP02	VIDEO I SW	O	VA	VIDEO IN/OUT select signal. Not used.
95	PA1/PP01	VA PB MODE	O	ALL	Video/audio circuit REC/PB select signal. "H": PB.
96	PA0/PP00	VI SWP	O	VA	RF switching pulse signal for video circuit. 30 Hz, 50% duty pulse.
97	PB7/PP015	RF SWP	O	ALL	RF switching pulse signal for REC/PB amp and Audio circuit. 30 Hz, 50% duty pulse.
98	0	H CHG	O	VA	Not used.
99	11	CAP ON	O	MD	Capstan driver ON/OFF control signal. "H" when capstan ON.
100	PB4/PP012	CAP FWD/RVS	O	MD	Capstan rotating direction control signal. "H": FWD, "L": RVS.

10	S21	S21	O		
11	S22	S22	O		
12	S23	S23	O		
13	S24/BP0	EEPROM CS	O		Chip select signal to EEPROM (IC406 on VS-116 board). 1/2V period "L" pulse.
14	S25/BP1	N.C	O		Not used.
15	S26/BP2	TG STBY 1	O	CAM	Power save control signal to timing generator (IC801 on VC-147 board). Normally "L".
16	S27/BP3		O		N.C.
17	S28/BP4	CS TITLE	O	CAM	Not used.
18	S29/BP5	REMO CS	O		Chip select signal to sircs remote controller (IC907 on VS-116 board). 1V period "L" pulse.
19	S30/BP6	S RAM CS	O		Not used.
20	S31/BP7	CAM COSM CS	O	CAM	Chip select signal to camera controller (IC709 on VC-147 board). 1V period "L" pulse.
21	COM0	COM 0	O		Common terminal drive signal to LCD. (Four value output of 0, 1.7, 3.3, 5V) Not used.
22	COM1	COM 1	O		
23	COM2	COM 2	O		
24	COM3	COM 3	O		
25	BIAS	BIAS	O		Bias voltage output for voltage deviding resistor. Not used.
26	VLC0	VCC 0	I		Power source 0 input
27	VLC1	VCC 1	I		Power source 1 input (Power source for LCD dirve. Not used.)
28	VLC2	VCC 2	I		Power source 2 input
29	P40	K OUT 4	O	all	KEY matrix output. 1V period "L" pulse output when corresponding key is pressed. "L" when other cases.
30	P41	K OUT 5	O	all	
31	P42	SYS RESET	O	all	Output signal to reset each IC when power is turned on. Normally "H".
32	P43	TALLY	O	EVF	Tally LED ON/OFF signal. "L": ON.
33	VSS	VSS			GND
34	P50	K OUT 0	O	all	KEY matrix output. 1V period "L" pulse output when correspcnding key is pressed. "L" when other cases.
35	P51	K OUT 1	O	all	
36	P52	K OUT 2	O	all	
37	P53	K OUT 3	O	all	
38	P00/INT4	BATT IN	I		Clock select to 32 kHz when "L" and to 4.19 MHz with "H" when Battery is turned on. "L" is select.
39	P01/SCK	SCK	O	all	Serial clock output terminal, Serial clock (2 μS) communication.
40	P02/SO/SB0	DATA TO SLVE	O	all	Serial bus output terminal, Serial clock (2 μS) communication.
41	P03/SI/SB1	DATA TO MSTR	I	all	Serial bus input terminal, Serial clock (2 μS) communication.
42	P10/INT0	SYSTEM SYNC	I	all	(Edge detection vector interruption), System synchronization input port from CXP80624 (IC402 on VS-116 board).
47	P21	CAM DD ON	O	FS	when power switch is in "CAMERA" position.
48	P22/PCL	VIDEO D/A CS	O	VA	Serial data load signal to video circuit EVR (IC156, 158 on VS-116 board). 1V period "H" pulse.
49	P23/BUZ	BEEP	O		Not used.
50	P30/LCDCL	VIDEO CS	O	VA	Chip select signal to Y process IC (IC151 on VS-116 board). 1V period "L" pulse.
51	P31/SYNC	VTR COSM CS	O		Chip select signal to mechanism controller (IC402 on VS-116 board). 1V period "L" pulse.
52	P32	SG CS	O	CAM	Chip select signal to sync generator (IC704 on VC-147 board). 1V period "L" pulse.
53	P33	CRTC CS	O	CAM	Strobe signal for character generator (IC406 on VS-116 board). 1V period "H" pulse.
54	VDD	VDD			VDD
55	XT1	XT1	I		SUB system clock. 32 kHz oscillation terminal.
56	XT2	XT2			
57	N.C.	N.C.			N.C.
58	X1	X1	I		Main system clock. 4.19 MHz oscillation terminal.
59	X2	X2	I		
60	P60/KK0	K IN 0	I	all	KEY matrix input. 1V period "L" pulse input when corresponding key is pressed. "H" when other case.
61	P61/KR1	K IN 1	I	all	
62	P62/KR2	K IN 2	I	all	
63	P63/KR3	K IN 3	I	all	
64	P70/KR4	K IN 4	I	all	
65	P71/KP5	K IN 5	I	all	
66	P72/KP6	K IN 6	I	all	
67	P73/KP7	CC DOWN	I	MD	Cassette compartment lock switch input. "L": Lock.
68	RESET	RESET	I		System reset input. "L": Reset, Normally: "H".
69	S0	CLK CHK	O		N.C.
70	S1	S1	O		Segment terminal drive signal to LCD. (Four value output of 0, 1.7, 3.3, 5V) Not used.
71	S2	S2	O		
72	S3	S3	O		
73	S4	S4	O		
74	S5	S5	O		
75	S6	S6	O		
76	S7	S7	O		
77	S8	S8	O		
78	S9	S9	O		
79	S10	S10	O		
80	S11	S11	O		

3-14. INTERFACE

3-14-1. System Control – Video/Audio Block Interface (VS-116 BOARD)

NAME	I/O	No.	VTR MODE																CAMERA MODE					
			STOP	FF	REW	FR SEARCH		PB	PICTURE SEARCH		PB-PAUSE	FRAME	SLOW	X2	SHUTTLE EDIT *3		REC *4	REC *4 PAUSE	STAND BY	REC	EDIT SEARCH		REC REVIEW	
						CUE	REVIEW		CUE	REVIEW					FWD	REV					FWD	RVS	FWD	RVS
SP/LP	O	IC402 51	*1	H	H	*2	*2	*2	*2	*2	*1	*1	*1	*1	*2	*2	H	H	H	H	*2	*2	H	H
VA PB MODE	O	IC402 55	L	L	L	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	H	H	H	H
AUDIO MUTE *13	O	IC402 46	L	L	L	H	H	L	H	H	H	H	H	L	H	H	L	L	L	L	H	H	H	H
VIDEO MUTE	O	IC402 20	*14	*14	*14	*15	*15	*15	*15	*15	*15	*15	*15	*15	*15	*15	*14	*14	L	L	*15	*15	*15	*15
CAM/LINE	O	IC402 26	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	L
JOG VD	O	IC402 3	L	L	L	*5	*5	L	*5	*5	*5	*5	*5	*5	*5	*5	L	L	L	L	*5	*5	*5	*5
RP PB MODE	O	IC402 1	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	L	H	H	H	H
FE ON	O	IC402 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	L	H	H	H	H
RF SWP	O	IC402 57	L	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
JOG	O	IC402 4	L	L	L	H	H	L	H	H	H	H	H	H	H	H	L	L	L	L	H	H	H	H
VIDEO CS	O	IC403 50	V period "L" pulse																					
VIDEO D/A CS	O	IC403 48	V period "H" pulse																					
DATA TO MSTR	I	IC403 41	V period "L" pulse																					
DATA TO SLVE	O	IC403 40	V period pulse train																					
SCK	I	IC403 39	V period "H" pulse																					
PB SP/LP DET	I	IC402 65	L	*10	*10	*10	*10	L	*10	*10	*10			*10	L	*10	H	H	H	H	L	*10	L	*10
CLOG	I	IC402 62	H	*11	*11	*11	*11	*11	*11	*11	*11	*11	*11	*11	*11	*11	H	*11	*11	H	*11	*11	*11	*11
VTR SYNC	I	IC402 64	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12

*1. Outputs discrimination result of the mode just before. "H": SP mode, "L": LP mode.
*2. Outputs discrimination result of the playback tape. "H" : SP mode, "L": LP mode.
*3. Edit search button pressed when playback pause mode.
*4. Mode for adjustment.
*5. False VD signal
*7. 30 Hz duty 50% pulse (synchronized with drum rotation)
*10. "H": SP recording area on tape. "L": LP recording area.
*11. "H": no recording area or drop out area on tape. Head clog detection input.
*12. Composite sync signal input separated from line input video signal, camera video signal or playback video signal. (polarity +)
*13. "H" during camera mode load/unload.
*14. "L" when external input (video) present. "H" when other cases.
*15. "H" when tape no signal. "L" when other cases.

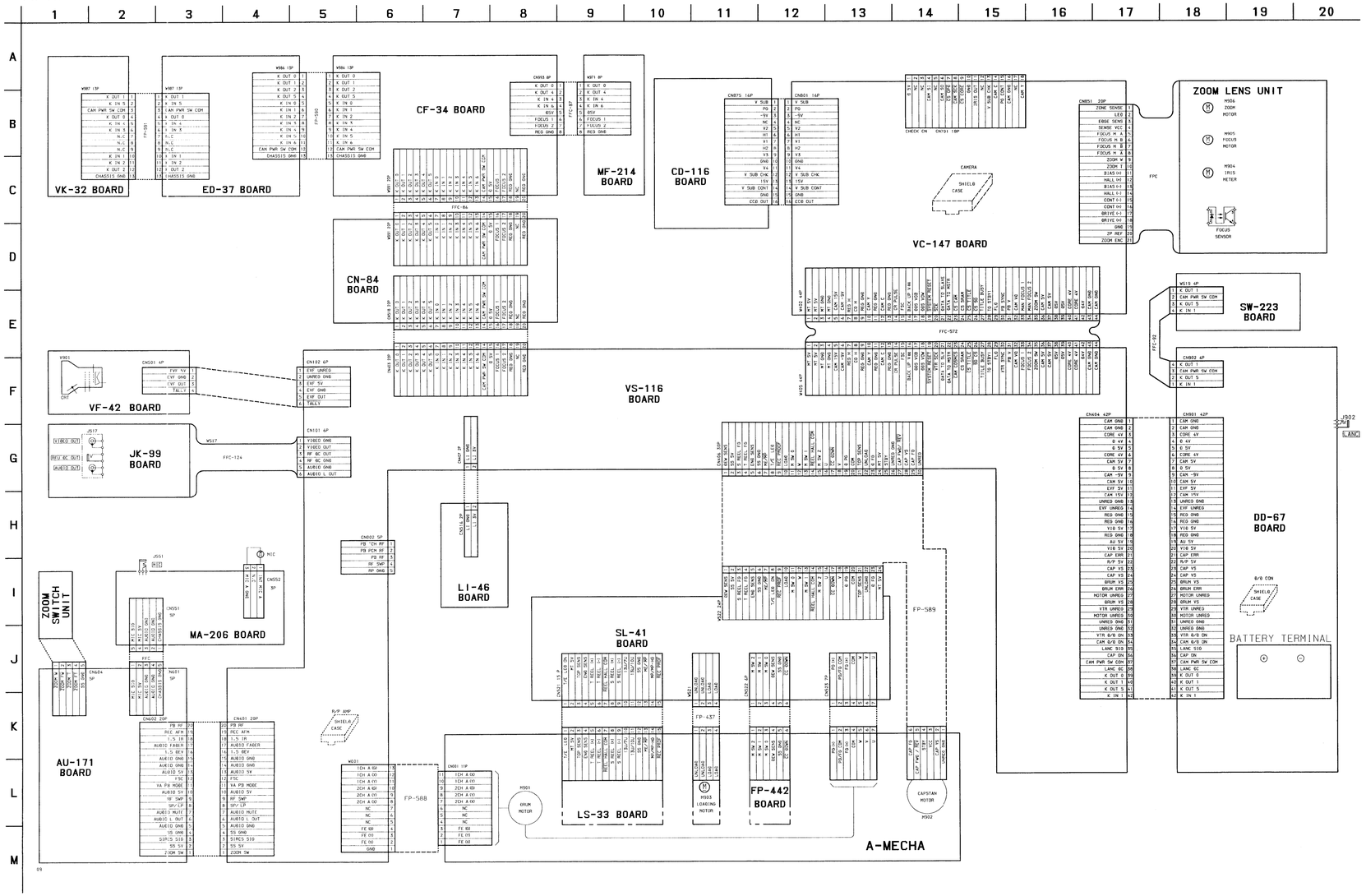
3-14-2. System Control – Servo Block Interface

NAME	I/O	No.	VTR MODE																CAMERA MODE					
			STOP	FF	REW	FR SEARCH		PB	PICTURE SEARCH		PB-PAUSE	FRAME	SLOW	X2	SHUTTLE EDIT *13		REC *14	REC *14 PAUSE	STAND BY	REC	EDIT SEARCH		REC REVIEW	
						CUE	REVIEW		CUE	REVIEW					FWD	REV					FWD	RVS	FWD	RVS
T.REEL FG	I	IC402 60	–	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	–	–	*1	*1	*1	*1	*1
S.REEL FG	I	IC402 59	–	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	–	–	*1	*1	*1	*1	*1
ATF ERROR	I	IC402 58	–	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
DRUM PG	I	IC402 66	–	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
DRUM FG	I	IC402 67	–	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
CAP FG/ CFG HMS	I	IC402 68, 75	–	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5
CAP ON	O	IC402 98	L	H	H	H	H	H	H	H	L	*8	*8	H	H	H	H	L	L	H	H	H	H	H
REF PILOT	O	IC402 63	*7	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
RP PB MODE	O	IC402 1	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	L	H	H	H	H
DRUM REV *10	O	IC402 33	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CAP FWD/ RVS	O	IC402 100	L	H	L	H	L	H	H	L	L	*8	*8	H	H	L	H	L	L	H	H	L	H	L
DRUM PWM	O	IC402 74	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9
CAP PWM	O	IC402 73	L	*9	*9	*9	*9	*9	*9	*9	L	*9	*9	*9	*9	*9	*9	L	L	*9	*9	*9	*9	*9
LM LIM CONT *11	O	IC402 31	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
DRUM ON *12	O	IC402 81	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

*1. Inputting waveform which is similar to sine wave according to reel rotation.
*2. ATF error voltage input
*3. One PG pulse input per one drum rotation, approx. 30 Hz.
*4. 12 FG pulses input per one drum rotation, approx. 360 Hz.
*5. 520 FG pulses input per one capstan rotation. Approx. 994 Hz when REC/PB (SP). 498 Hz when PB (LP).
*6. Four frequencies output synchronized with drum rotation. f1=102.54 kHz, f2=118.95 kHz, f3=165.21 kHz and f4=148.69 kHz
*7. f2 (118.95 kHz) output
*8. "H" pulse when tape run.
*9. 21.5 μsec period PWM signal
*10. Normally "H". Temporary "L" when load (drum reverse rotation).
*11. Temporary "H" when cassette loading (finger catch protection).
*12. "H": approx. 1.3 Vdc
*13. Edit search button pressed when playback pause mode.
*14. Mode for adjustment.

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

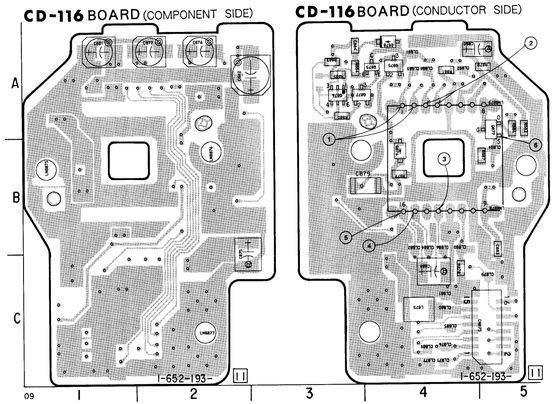
4-1. FRAME SCHEMATIC DIAGRAM

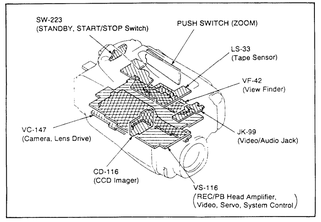


4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

CD-116 (CCD IMAGER) PRINTED WIRING BOARD

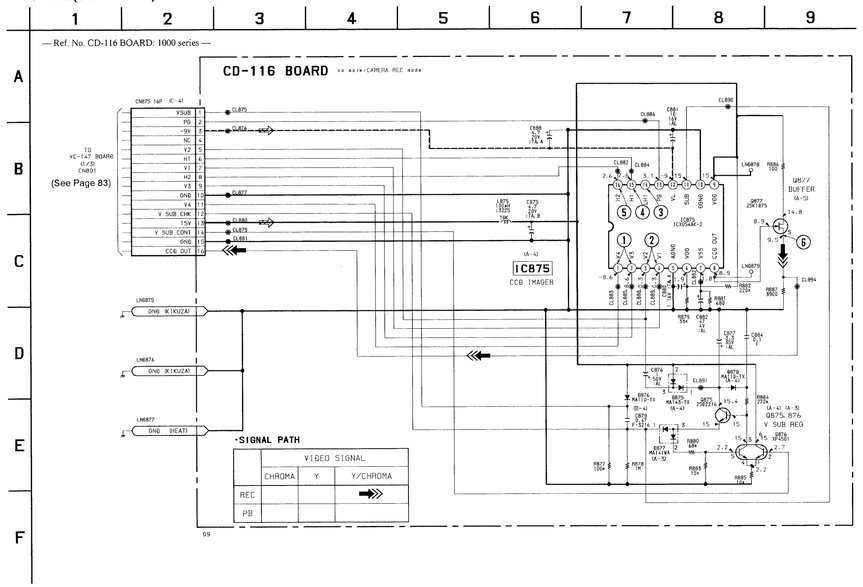
— Ref. No. CD-116 BOARD: 1000 series —





CD-116 (CCD IMAGER) SCHEMATIC DIAGRAM

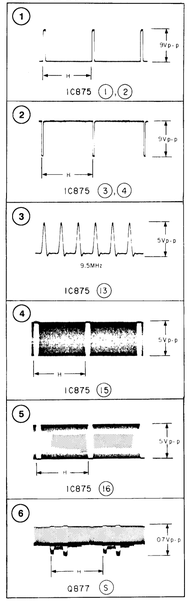
— Ref. No. CD-116 BOARD: 1000 series —



Note on the CCD imager replacement

- Some of this units require the correction data by the CCD imager (IC875 on CD-116 board), some do not.
  The correction data is input in F page and addresses 1D to 2C of the camera micro processor (IC709 on VC-147 board), and also written on the CCD data label put on the shield case (upper) of the DD-67 board.
  The correction data is not required for the CCD imager supplied for repair. Therefore, when replacing the CCD imager to which the CCD data label is put, remove the CCD data label and input 00 to F page and addresses 1D to 2C of the camera micro processor. Refer to the camera adjustment for input method.
- The CCD imager is not mounted for the already mounted CD-116 board supplied as the repair parts.
  When replacing the CD-116 board, remove the CCD imager from the old board and install on the new board.
- Perform all adjustments of the camera block when the CCD imager has been replaced.
- Handle the CCD imager with attention such as MOS IC as it may be broken by static electricity in the structure.
  Also, prevent the receiving light section from dust attached and strong light.

CD-116 BOARD



THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this , the necessary note is printed in each block.)

- **For printed wiring boards.**
- ○— : indicated a lead wire mounted on the component side.
- —— : indicated a lead wire mounted on the conductor side.
- ■ : Parts mounted on the conductor side.
- ▒▒ : Pattern from the side which enables seeing.
  (The other layers'patterns are not indicated.)
- Circled numbers refer to waveforms.
- ○or ● : Through hole.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component side)	Parts on the parts face side seen from the parts face are indicated.

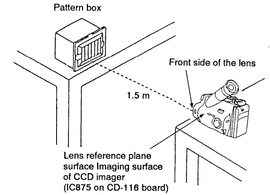
- **For schematic diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minuts side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W unless otherwise noted.
  Chip resistor are 1/10W or less unless otherwise noted.
  kΩ : 1000Ω , MΩ : 1000kΩ .
- All capacitors are in μF unless otherwise noted. pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- ▭ : panel designation.
- △ : internal component.
- ▭ : adjustment for repair.
- —— : B+ Line.
- - - - : B– Line.
- ⇒ : IN/OUT direction of (+, –) B LINE.
- Circled numbers refer to waveforms.

Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safty. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

- **Measuring conditions voltage value and waveform. (CAMERA REC mode)**
- The object is color bar chart of pattern box.
- Voltages are dc between ground and measurement points. Readings are taken with a digital multimeter (DC 10MΩ).
- Voltage variations may be noted due to normal production tolerances.

1. Connection



2. Adjust the distance so that the output waveform of Fig. a and the Fig. b can be obtain.

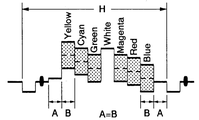


Fig. a (Video output terminal output waveform)

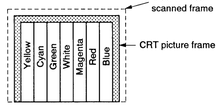


Fig. b (Picture on monitor TV)

- **(REC/PB mode)**
- Voltages are dc between ground and measurement points.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

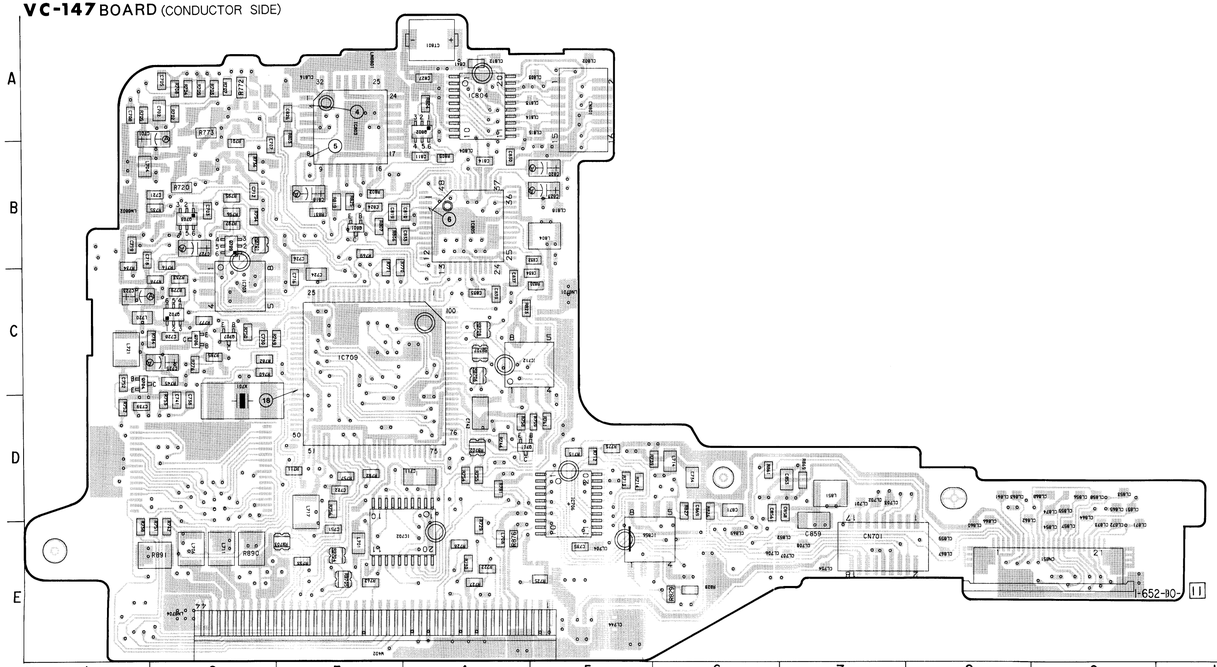
Note: Refer to "9-1-3. How to set the REC Mode" in VIDEO SECTION ADJUSTMENT. (See Page 205)

CAMERA

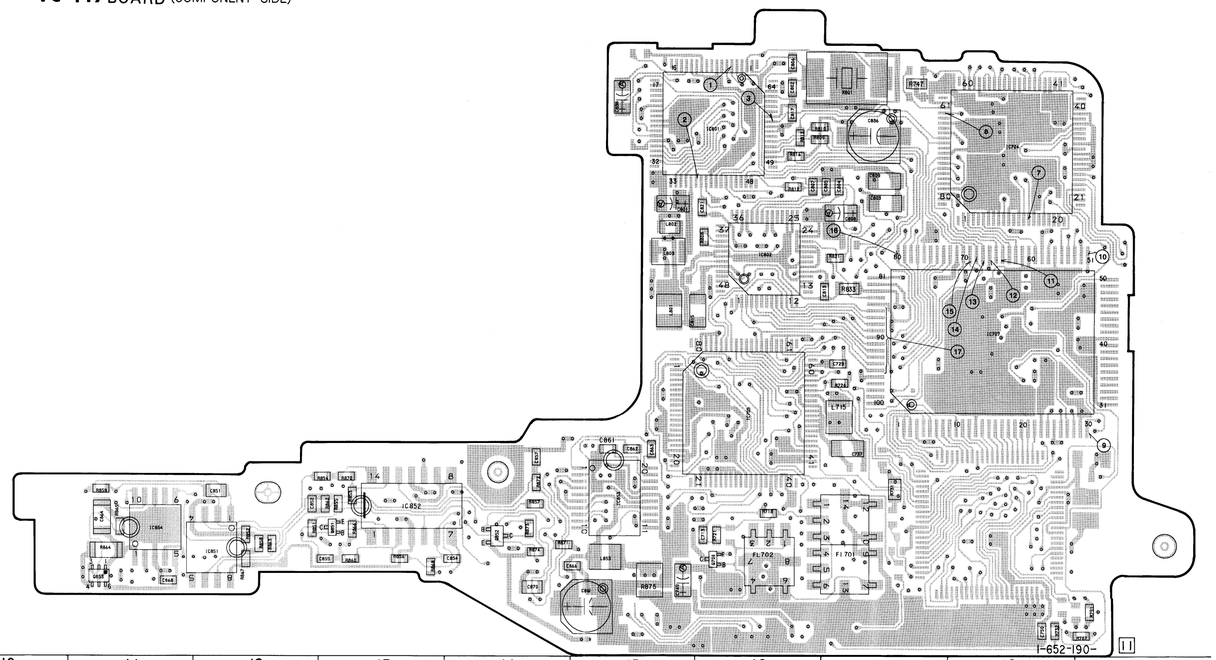
VC-147 (CAMERA, LENS DRIVE) PRINTED WIRING BOARD

— Ref. No. VC-147 BOARD: 3000 series —

VC-147 BOARD (CONDUCTOR SIDE)

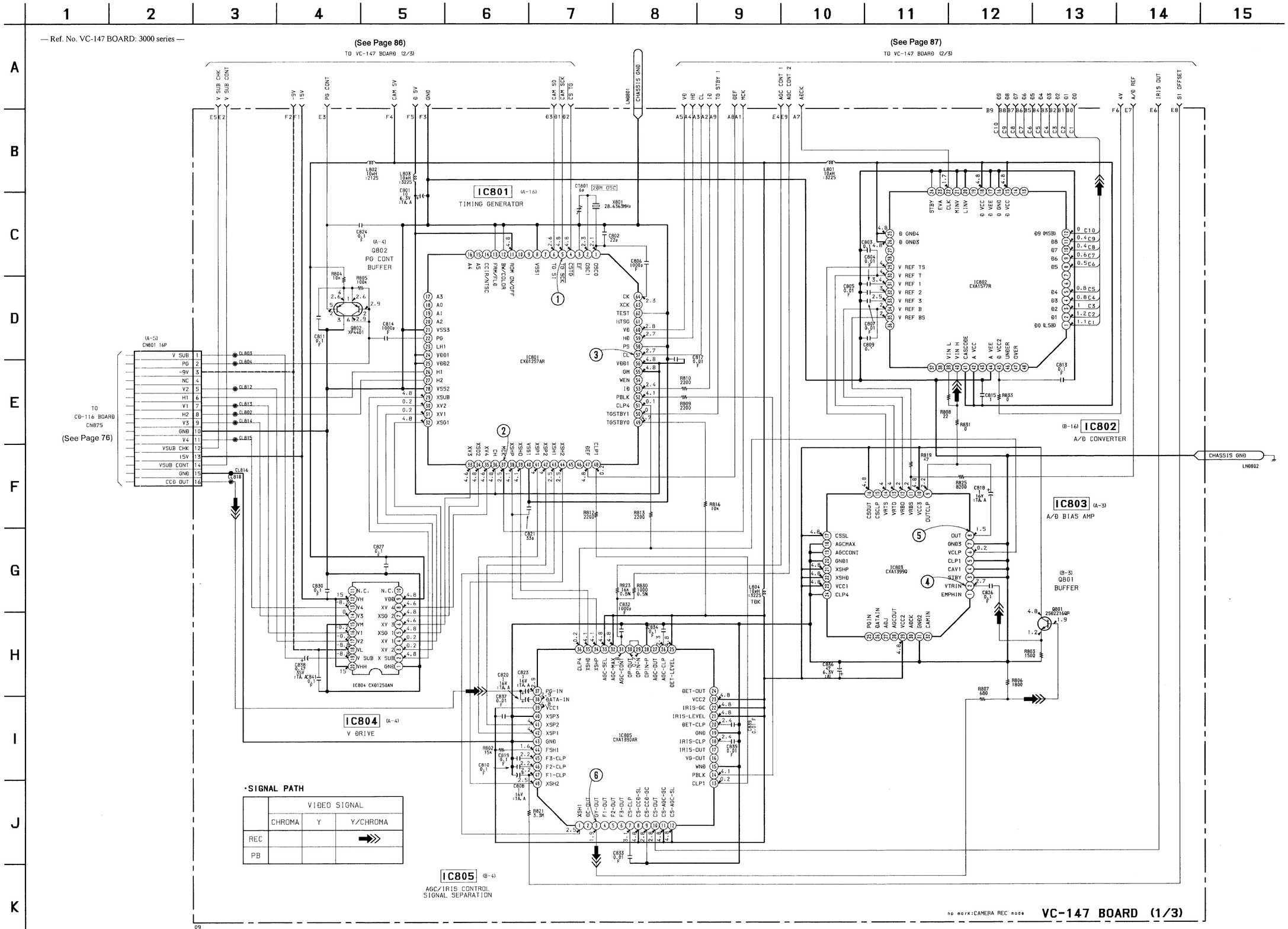


VC-147 BOARD (COMPONENT SIDE)



VC-147 (CAMERA) SCHEMATIC DIAGRAM

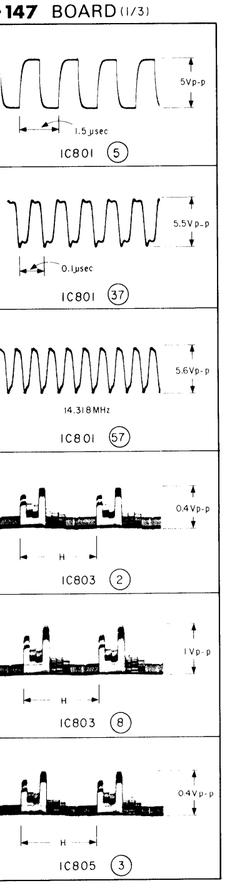
— Ref. No. VC-147 BOARD: 3000 series —

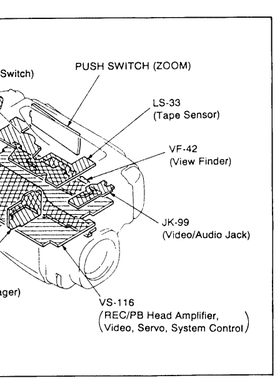


·SIGNAL PATH

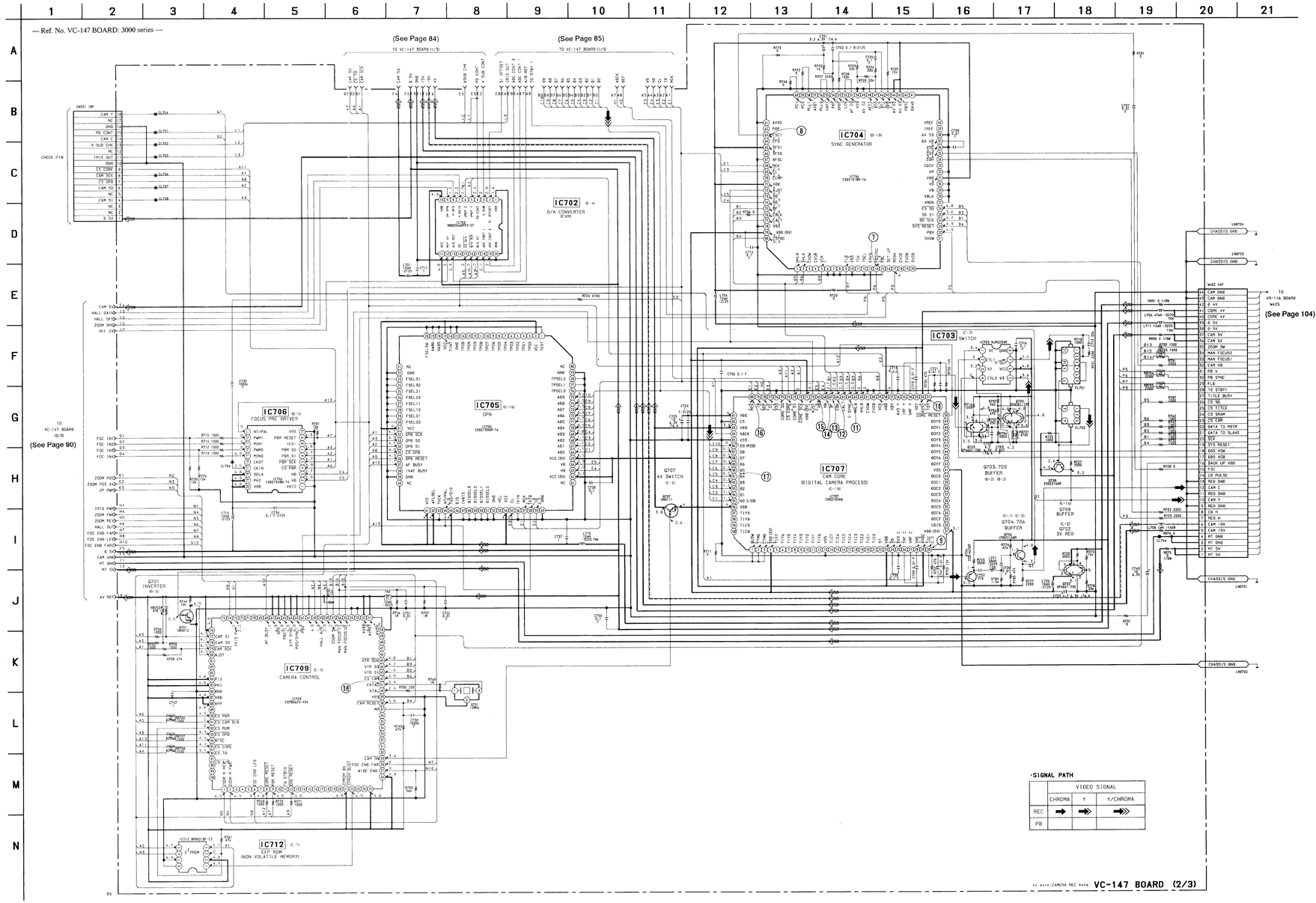
	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC			➡
PB			

VC-147 BOARD (1/3)

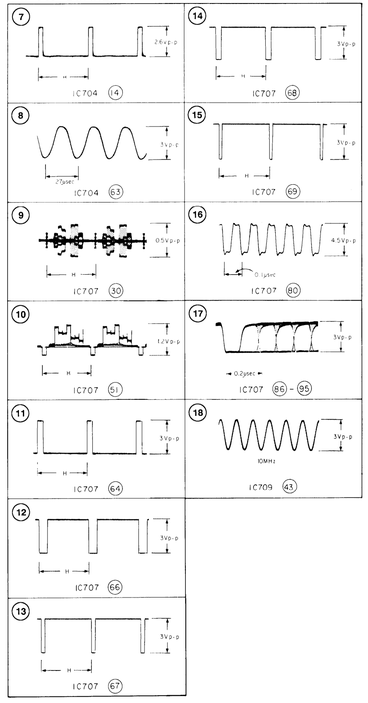




VC-147 (CAMERA) SCHEMATIC DIAGRAM



VC-147 BOARD (2/3)



VC-147 (LENS DRIVE) SCHEMATIC DIAGRAM

• Refer to page 79 for Printed Wiring Board.

— Ref. No. VC-147 BOARD: 3000 series —

IC852 IC-151
① — ③ HALL GAIN CONT
⑤ — ⑦ HALL BIAS CONT
⑧ — ⑩ ZOOM REF
⑫ — ⑭ IRIS PWM

Q851 HALL GAIN CONTROL IC-130

IC856 IC-62 IRIS DRIVE HALL AMP

IC851 IC-121 ZOOM POS LPS

IC853 IC-150 FOCUS MOTOR DRIVE

IC854 IC-151 ZOOM MOTOR DRIVE

Q853 DRIVE CURRENT LIMITER IC-111

Q852 IC-135 LED SWITCH

IC-18 CN851 21P

ZOOM LENS UNIT

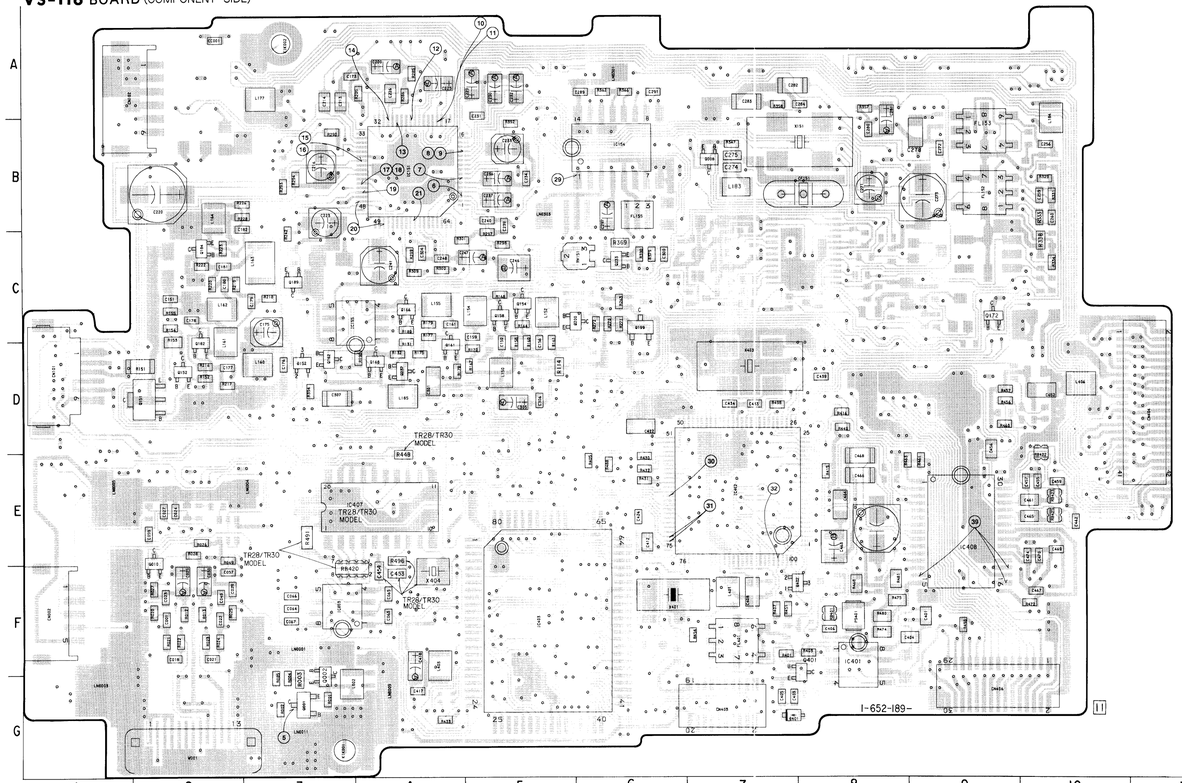
ZOOM POSITION
M804 IRIS METER
M802 ZOOM MOTOR
M803 FOCUS MOTOR
FOCUS SENSOR

TO VC-147 BOARD (2/3) (See Page 86)

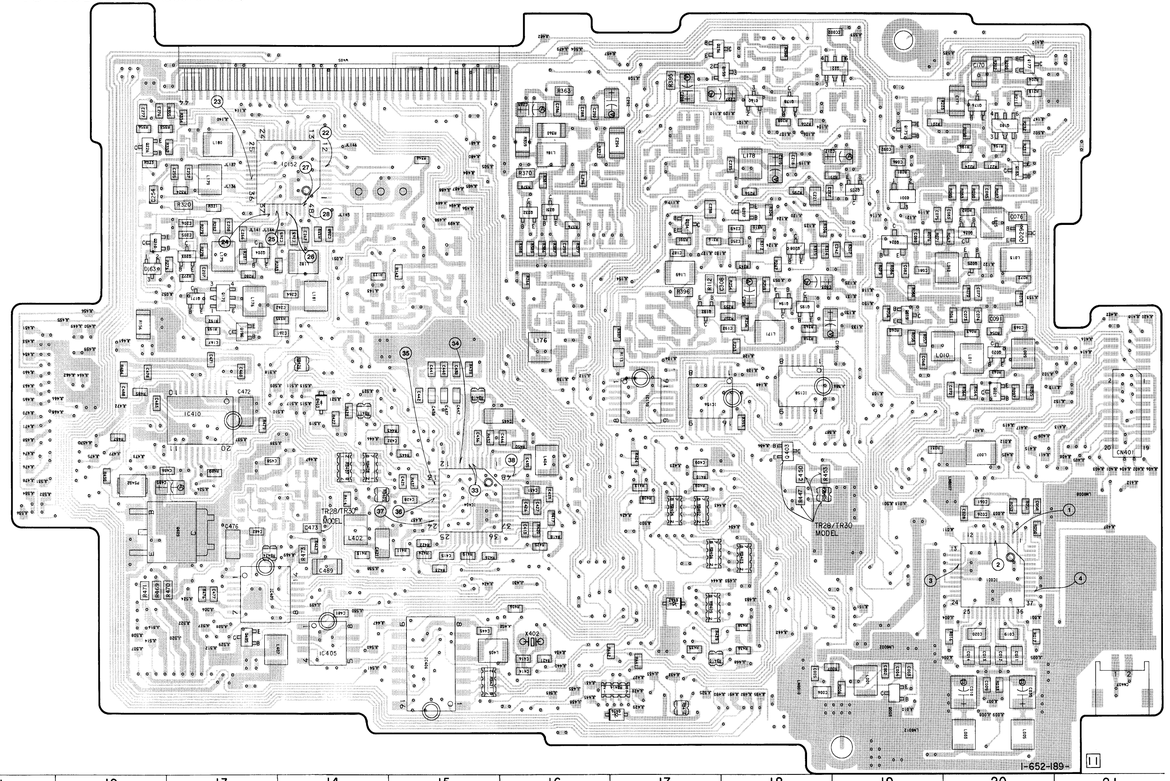
VS-116 (REC/PB HEAD AMPLIFIER, VIDEO, SERVO, SYSTEM CONTROL) PRINTED WIRING BOARD

— Ref. No. VS-116 BOARD: 4000 series —

VS-116 BOARD (COMPONENT SIDE)



VS-116 BOARD (CONDUCTOR SIDE)



VS-116 BOARD (1/3)

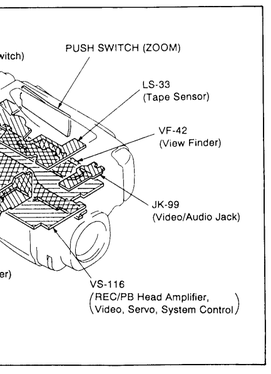
① 0.2Vp-p, H, IC001 ② REC

② 0.52Vp-p, 0.22 µsec, IC001 ⑥ REC

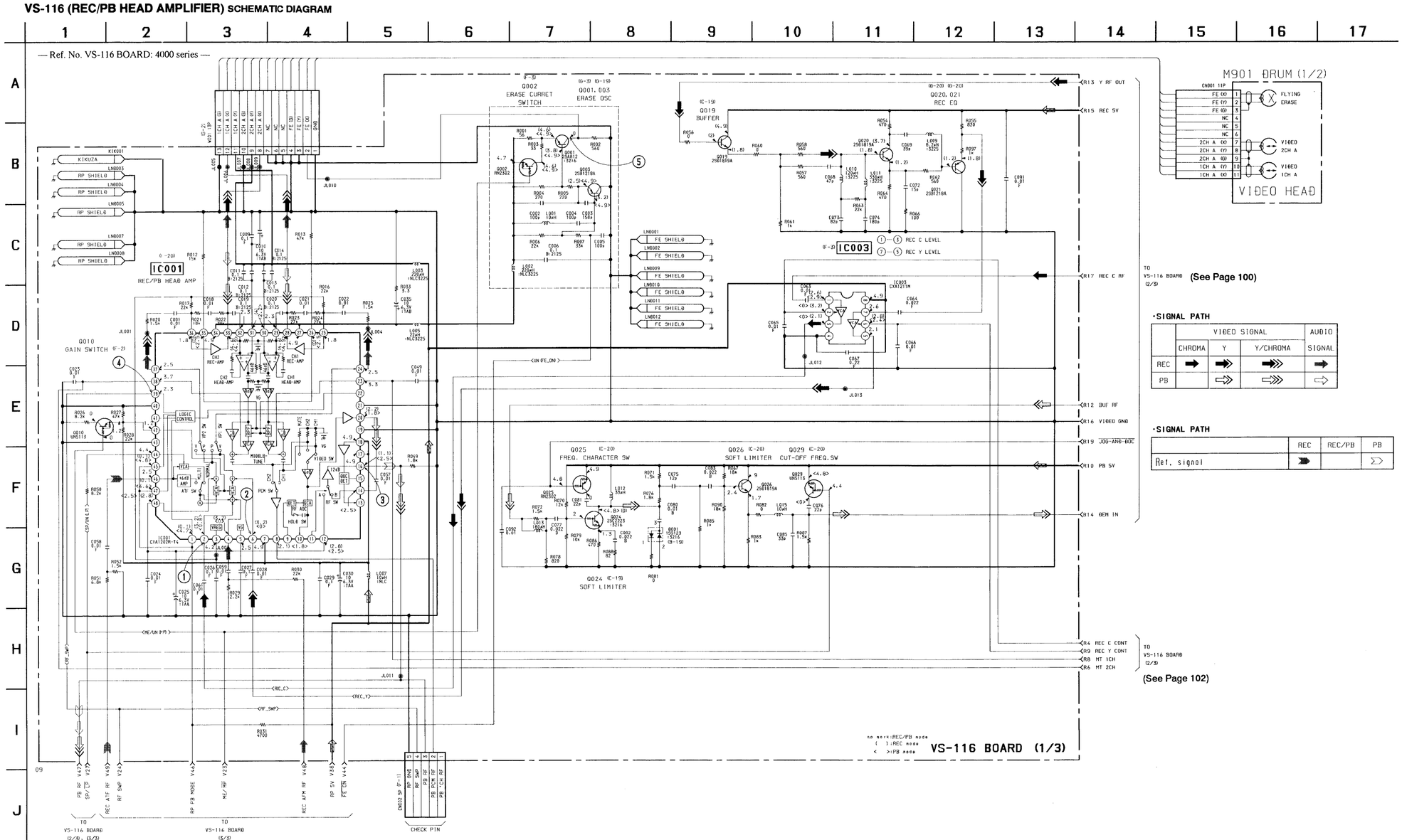
③ 0.6Vp-p, 0.22 µsec, IC001 ⑯ PB

④ 5Vp-p, 4 V, IC001 ㊴ REC/PB

⑤ 8.5Vp-p, 7.53MHz, Q001 Ⓒ REC


PUSH SWITCH (ZOOM)
LS-33 (Tape Sensor)
VF-42 (View Finder)
JK-99 (Video/Audio Jack)
VS-116 (REC/PB Head Amplifier, Video, Servo, System Control)

VS-116 (REC/PB HEAD AMPLIFIER) SCHEMATIC DIAGRAM



·SIGNAL PATH

	VIDEO SIGNAL			AUDIO
	CHROMA	Y	Y/CHROMA	SIGNAL
REC	➡	➡	➡	➡
PB		⇨	⇨	⇨

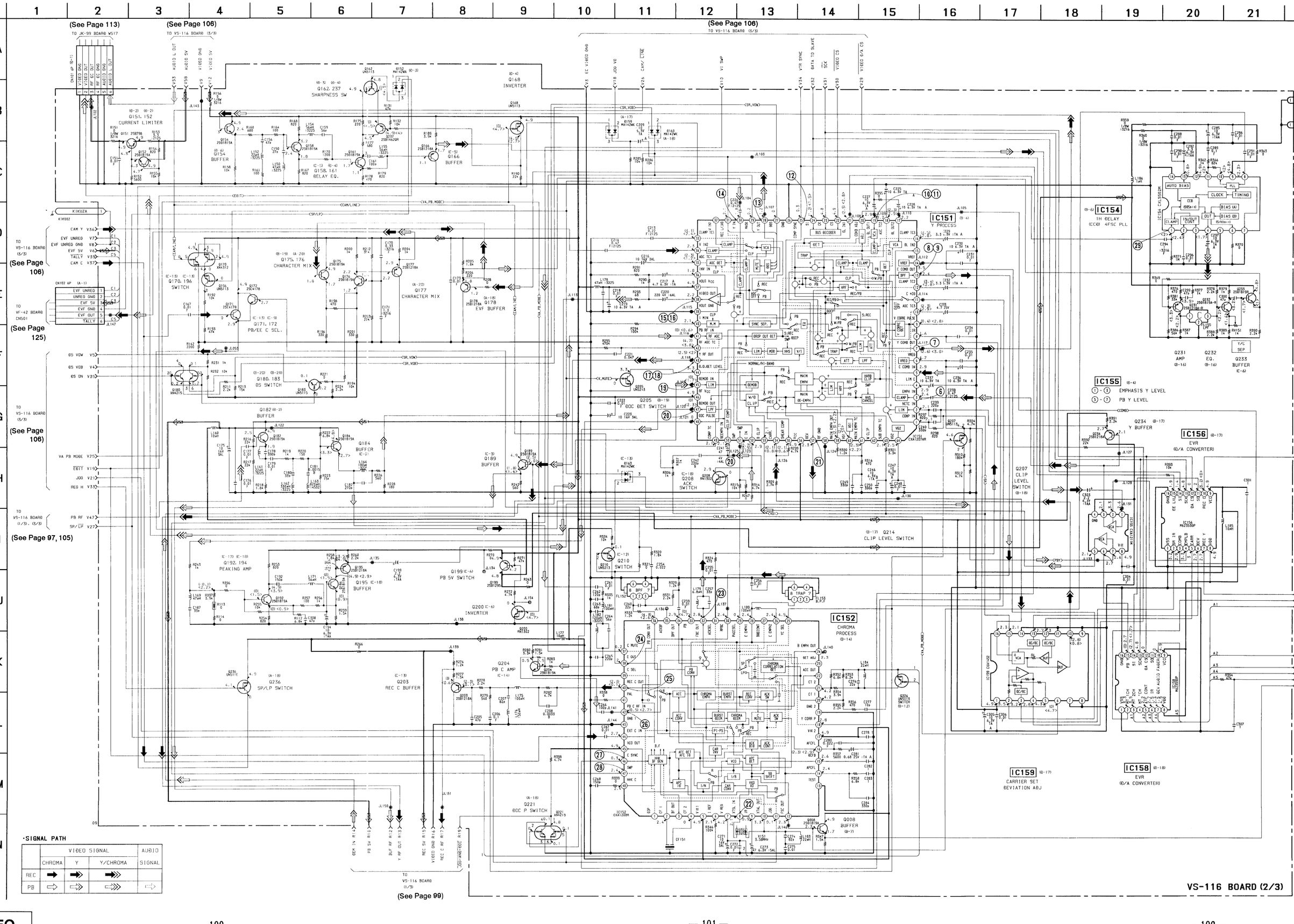
·SIGNAL PATH

	REC	REC/PB	PB
Ref. signal	➡		⇨

VS-116 (VIDEO) SCHEMATIC DIAGRAM

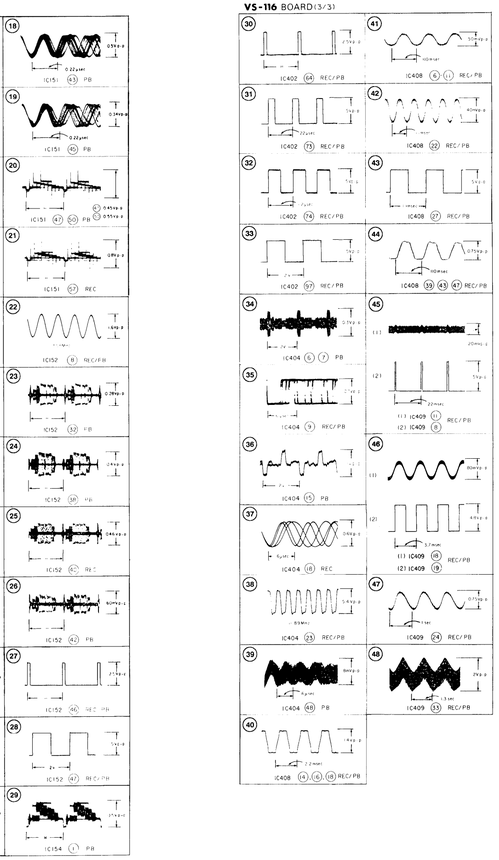
— Ref. No. VS-116 BOARD: 4000 series —

• Refer to page 93 for Printed Wiring Board.



Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safty. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piéce portant le numéro spécifié.

VS-116 BOARD(3/3)



VS-116 (SERVO, SYSTEM CONTROL) SCHEMATIC DIAGRAM

— Ref. No. VS-116 BOARD: 4000 series —

• Refer to page 93 for Printed Wiring Board.

·SIGNAL PATH

	REC	REC/PB	PB
Drum speed servo		▶	
Drum phase servo		▶	
Drum servo (speed and phase)		▶	
Capstan speed servo			
Capstan phase servo			▷▷
Capstan servo (speed and phase)		▶▷	
Ref. signal	▶	▶	▷

·SIGNAL PATH

	AUDIO SIGNAL
REC	➡
PB	⇨

(See Page 97) (See Page 97, 100) (See Page 102) (See Page 100) (See Page 100) (See Page 100) (See Page 101) (See Page 122) (See Page 113) (See Page 111) (See Page 133) (See Page 88) (See Page 118) (See Page 117)

IC401 BATTERY DETECT

IC402 SERVO SYSTEM CONTROL

IC403 MODE CONTROL (MASTER)

IC404 ATF SERVO, CLOG DETECT, SP/LP DETECT

IC405 EEP ROM

IC406 CHARACTER GENERATOR

IC407 SIMCS CONTROL

IC408 DRUM MOTOR DRIVE

IC409 LANC I/O

IC410 LOADING MOTOR DRIVE

Q401 5V REG

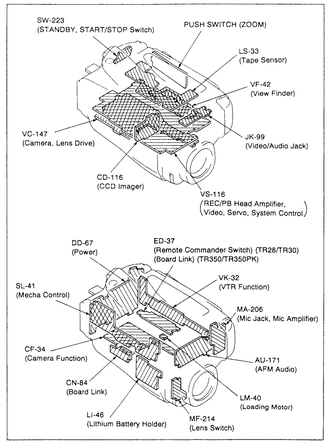
Q403 INVERTER

Q405 LED SWITCH

VS-116 BOARD (3/3)

CF-34 (CAMERA FUNCTION), CN-84 (BOARD LINK), ED-37 (REMOTE COMMANDER SWITCH) (TR28/TR30), (BOARD LINK) (TR350/TR350PK), MF-214 (LENS SWITCH), VK-32 (VTR FUNCTION), JK-99 (VIDEO/AUDIO JACK), LI-46 (LITHIUM BATTERY HOLDER) PRINTED WIRING BOARDS

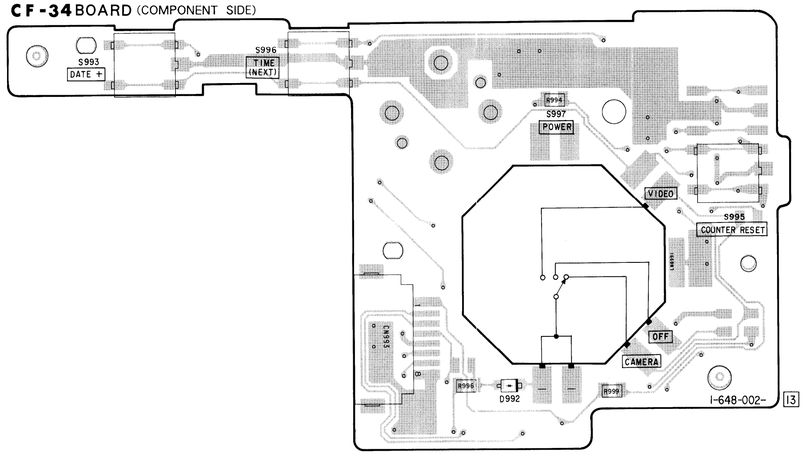
— Ref. No. JK-99 BOARD: 3000 series, LI-46 BOARD: 4000 series, MF-214 BOARD: 5000 series, CN-84 BOARD: 6000 series, CF-34 BOARD: 7000 series, ED-37 BOARD: 8000 series, VK-32 BOARD: 9000 series —



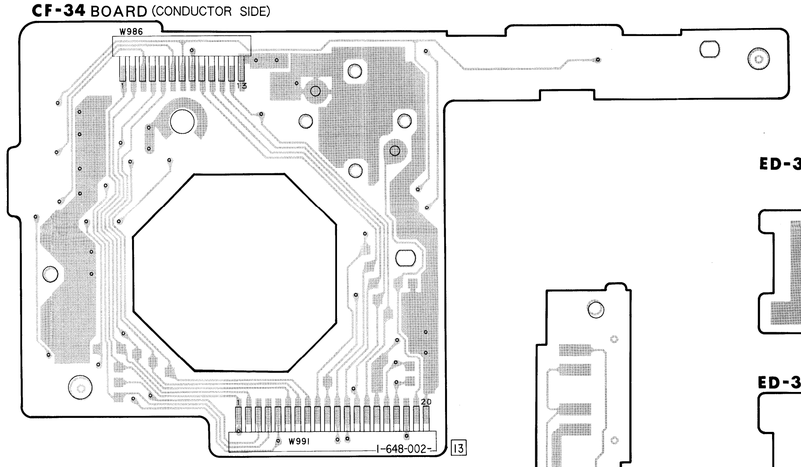
- **For printed wiring boards.**
  (CN-84, LI-46 and MF-214 boards)
- ○— : indicated a lead wire mounted on the component side.
- —— : indicated a lead wire mounted on the conductor side.
- ○ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

(The other layers'patterns are not indicated.)

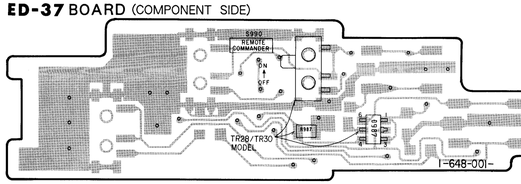
CF-34 BOARD (COMPONENT SIDE)



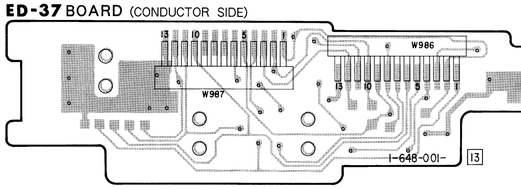
CF-34 BOARD (CONDUCTOR SIDE)



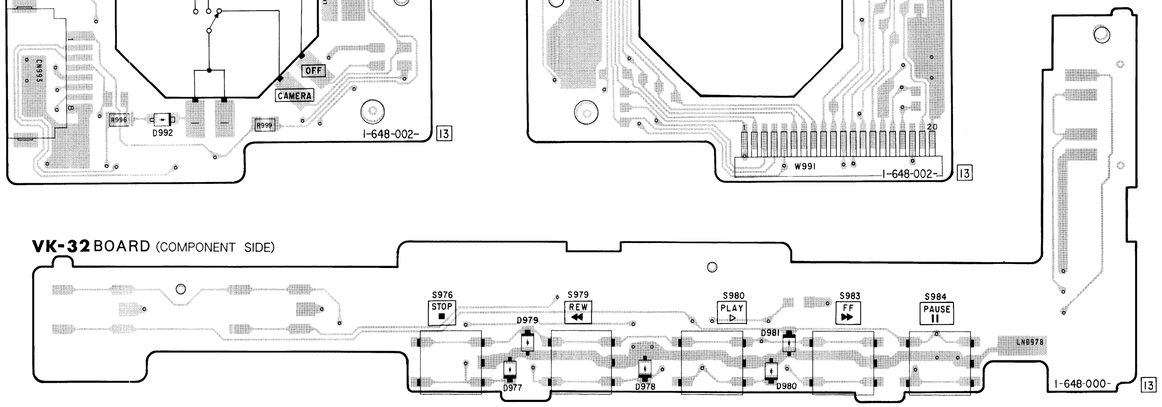
ED-37 BOARD (COMPONENT SIDE)



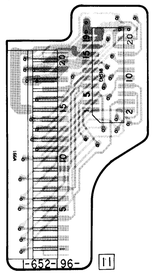
ED-37 BOARD (CONDUCTOR SIDE)



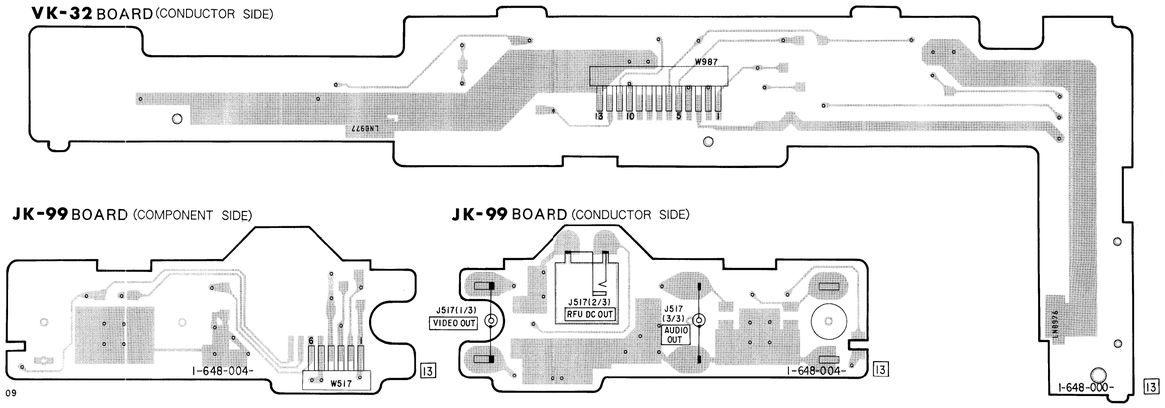
VK-32 BOARD (COMPONENT SIDE)



CN-84 BOARD (CONDUCTOR SIDE)



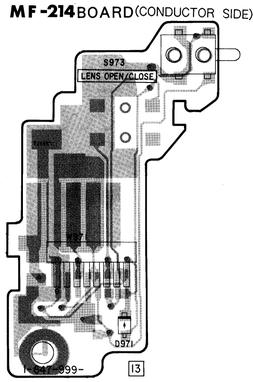
VK-32 BOARD (CONDUCTOR SIDE)



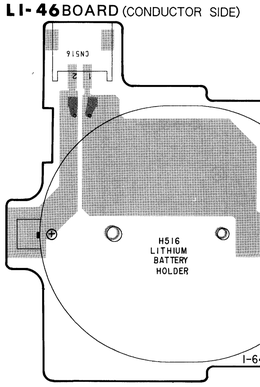
JK-99 BOARD (COMPONENT SIDE)

JK-99 BOARD (CONDUCTOR SIDE)

MF-214 BOARD (CONDUCTOR SIDE)



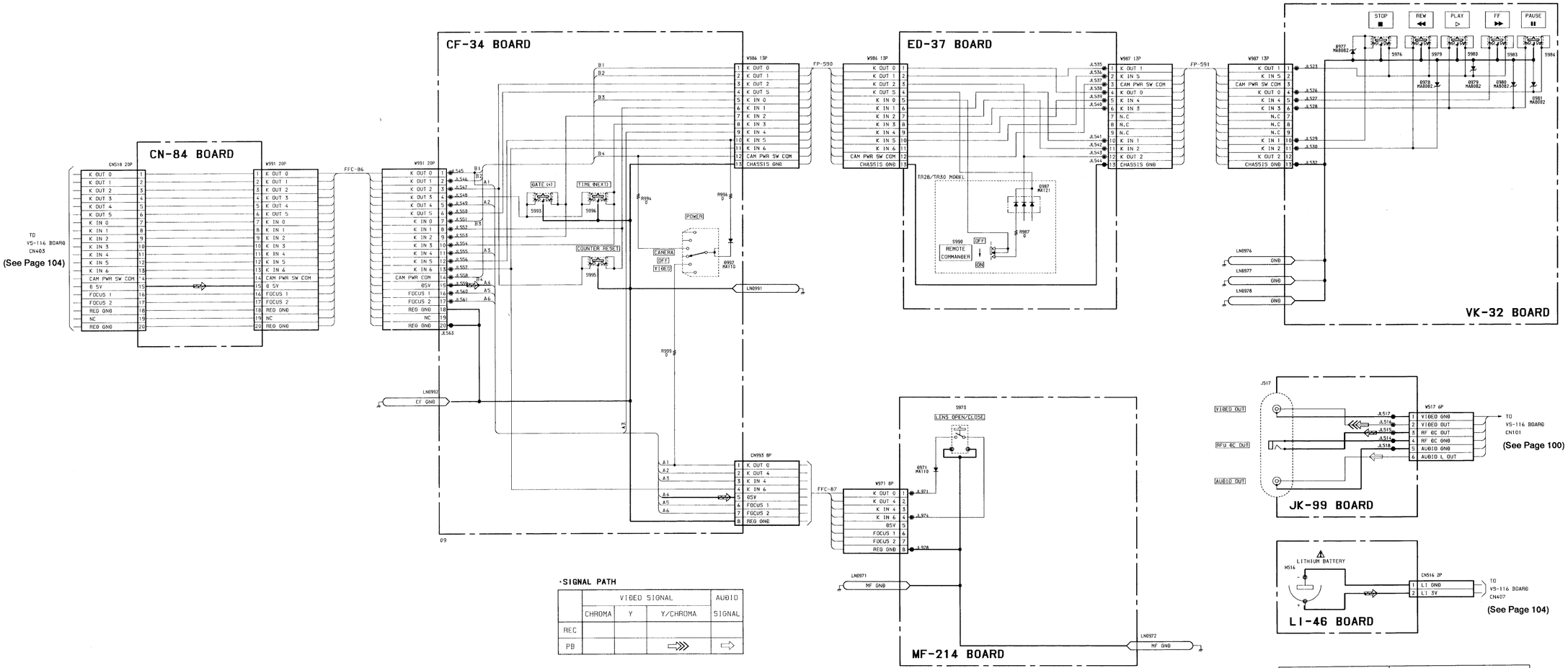
LI-46 BOARD (CONDUCTOR SIDE)



09

CF-34 (CAMERA FUNCTION), CN-84 (BOARD LINK), ED-37 (REMOTE COMMANDER SWITCH) (TR28/TR30), (BOARD LINK) (TR350/TR350PK), MF-214 (LENS SWITCH), VK-32 (VTR FUNCTION), JK-99 (VIDEO/AUDIO JACK), LI-46 (LITHIUM BATTERY HOLDER) SCHEMATIC DIAGRAM

— Ref. No. JK-99 BOARD: 3000 series, LI-46 BOARD: 4000 series, MF-214 BOARD: 5000 series, CN-84 BOARD: 6000 series, CF-34 BOARD: 7000 series, ED-37 BOARD: 8000 series, VK-32 BOARD: 9000 series —



•SIGNAL PATH

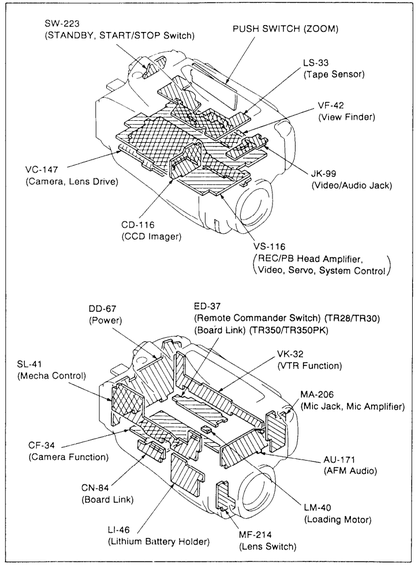
	VIDEO SIGNAL			AUDIO
	CHROMA	Y	Y/CHROMA	SIGNAL
REC				
PB			⇒	⇨

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safty.
Replace only with part number specified.

Note:
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

FUNCTION SWITCH

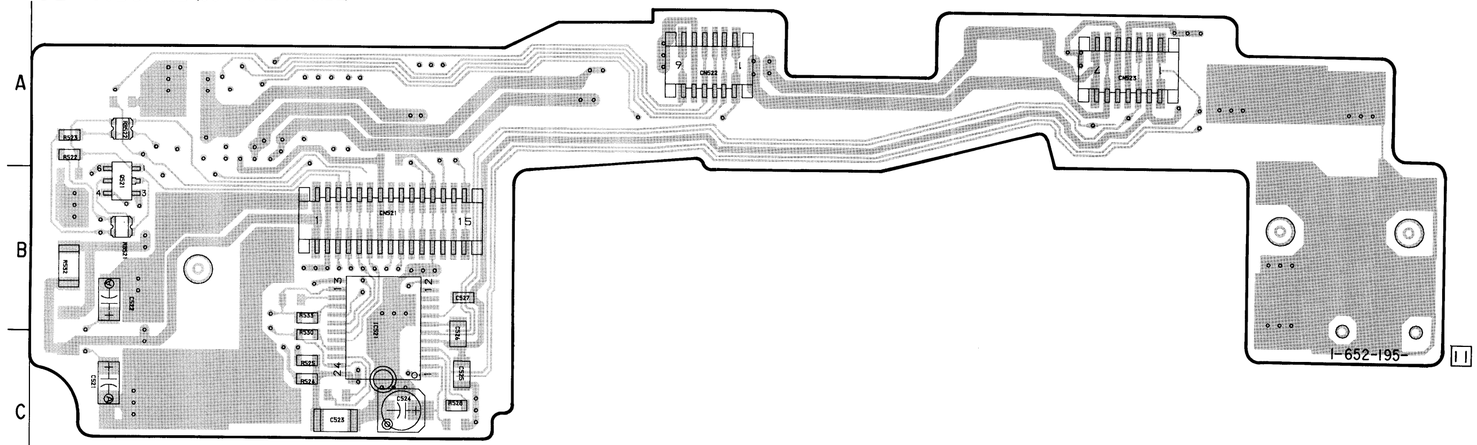
• Printed wiring boards of FP-442, LM-40 and LS-33 boards are omitted.



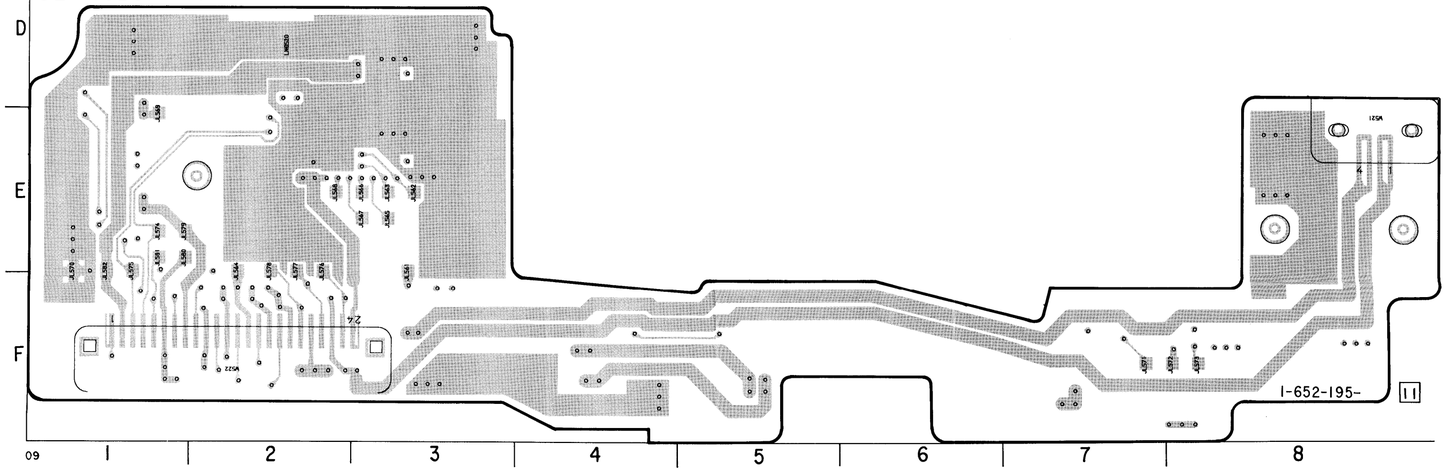
SL-41 (MECHA CONTROL) PRINTED WIRING BOARD

— Ref. No. SL-41 BOARD: 5000 series —

SL-41 BOARD (COMPONENT SIDE)

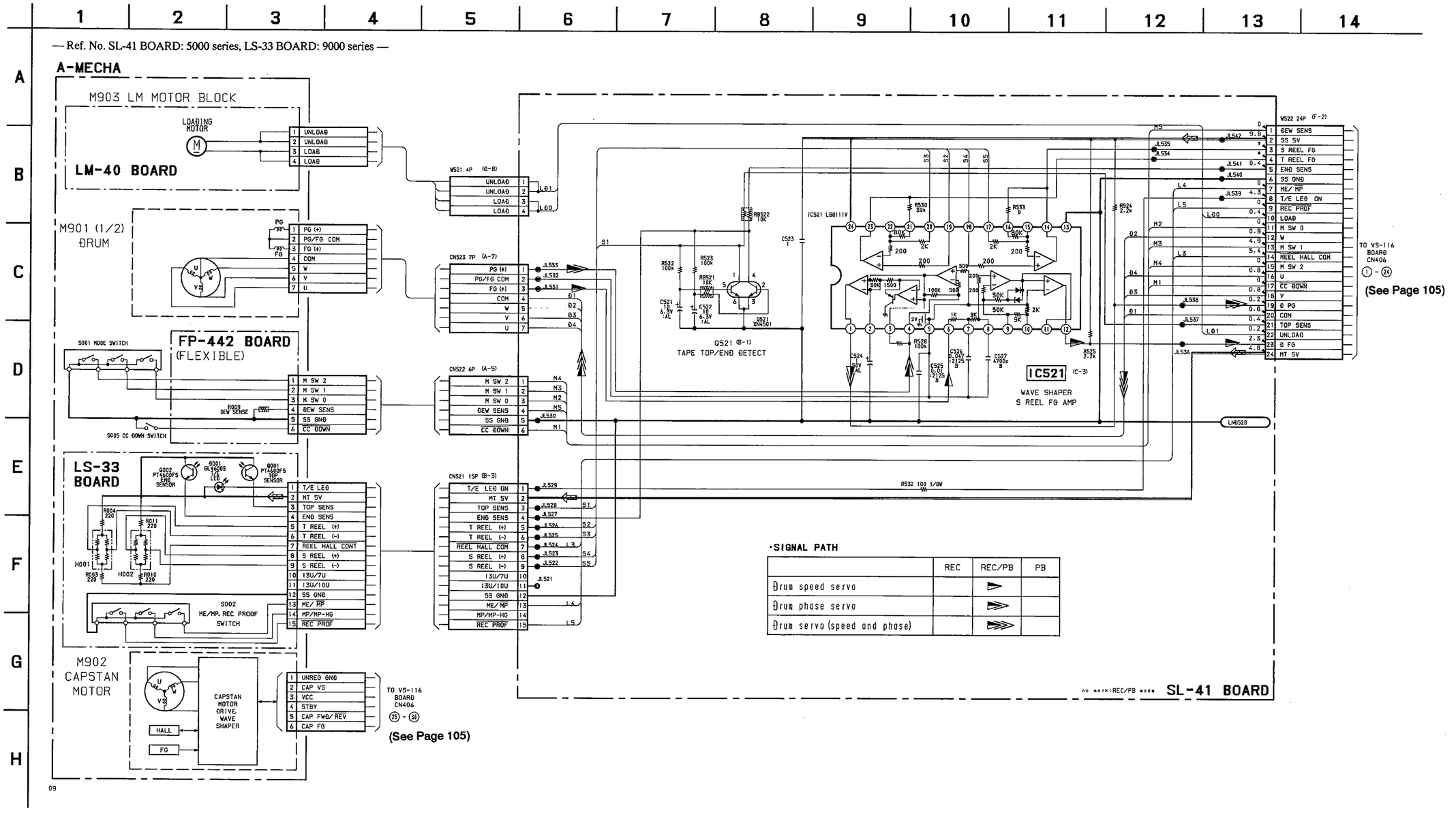


SL-41 BOARD (CONDUCTOR SIDE)



SL-41 (MECHA CONTROL), FP-442 (MODE SWITCH), LM-40 (LOADING MOTOR), LS-33 (TAPE SENSOR) SCHEMATIC DIAGRAM

— Ref. No. SL-41 BOARD: 5000 series, LS-33 BOARD: 9000 series —

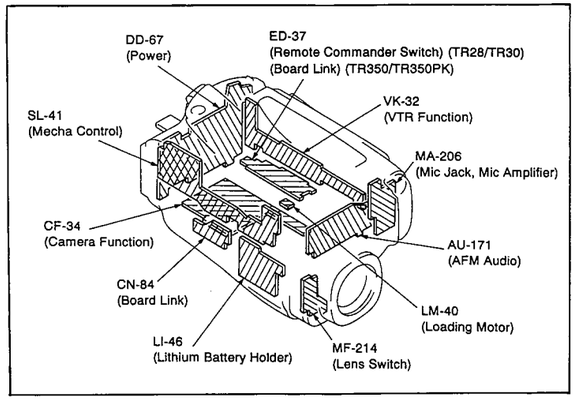


	REC	REC/PB	PB
Drum speed servo		▶	
Drum phase servo		▶▶	
Drum servo (speed and phase)		▶▶▶	

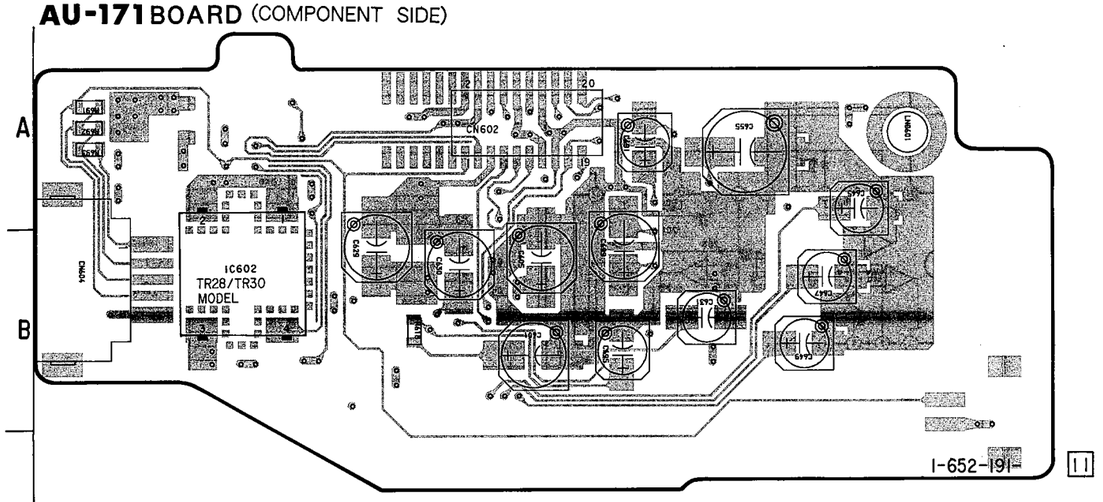
- Printed wiring boards of FP-442, LM-40 and LS-33 boards are omitted.

AU-171 (AFM AUDIO), MA-206 (MIC JACK, MIC AMPLIFIER) PRINTED WIRING BOARDS

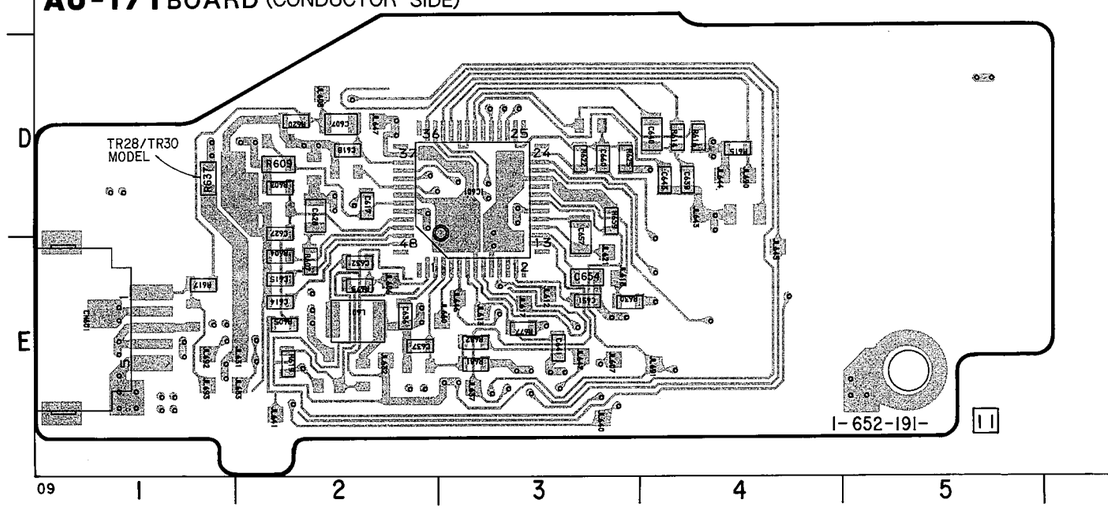
— Ref. No. AU-171, MA-206 BOARDS: 2000 series —



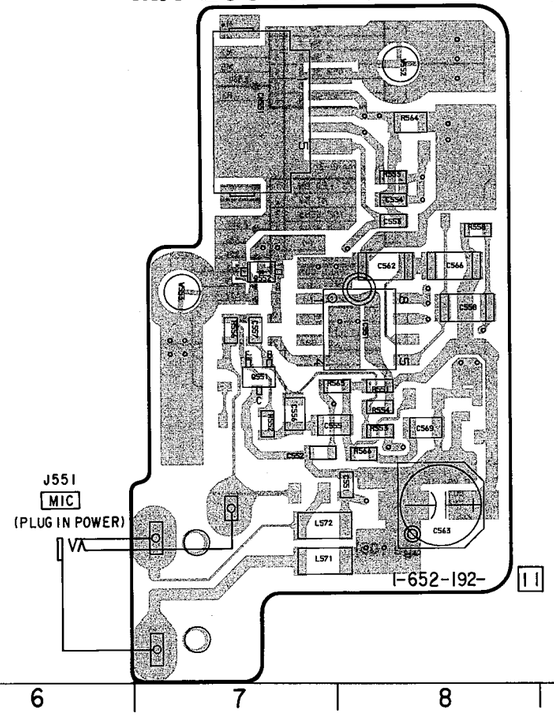
AU-171 BOARD (COMPONENT SIDE)



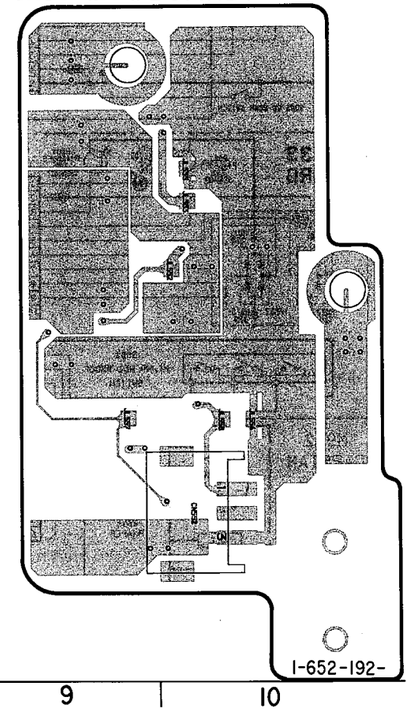
AU-171 BOARD (CONDUCTOR SIDE)



MA-206 BOARD (COMPONENT SIDE)

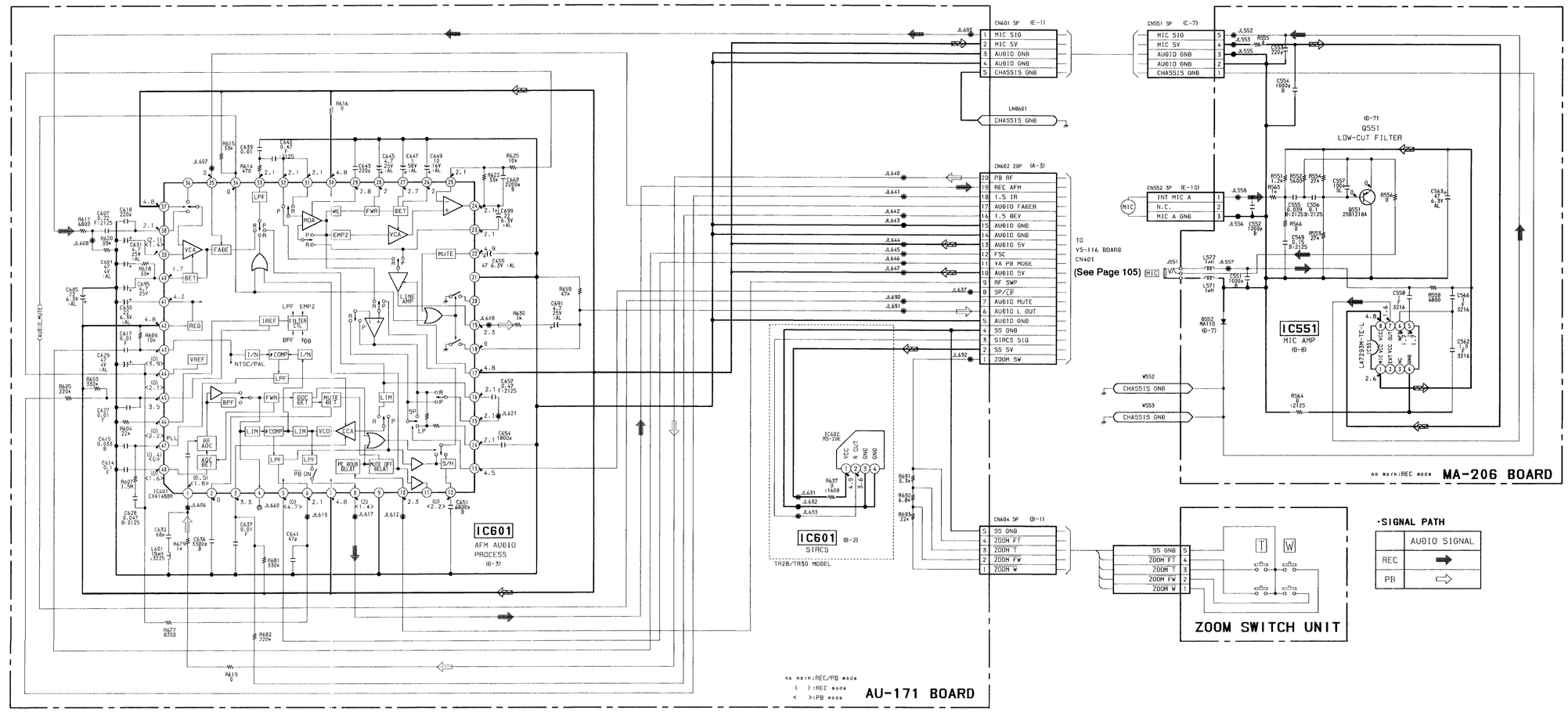


MA-206 BOARD (CONDUCTOR SIDE)

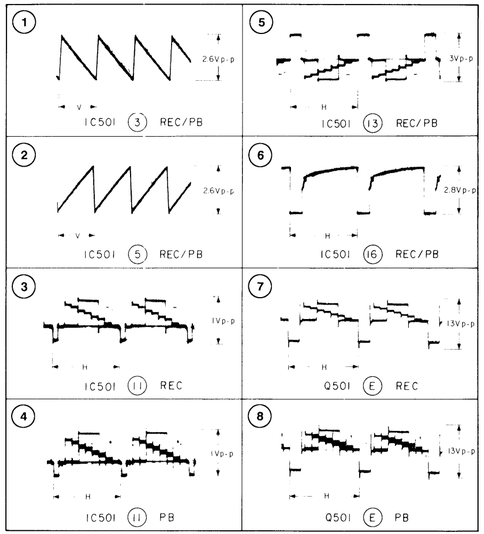


AU-171 (AFM AUDIO), MA-206 (MIC JACK, MIC AMPLIFIER) SCHEMATIC DIAGRAM

— Ref. No. AU-171, MA-206 BOARDS: 2000 series —

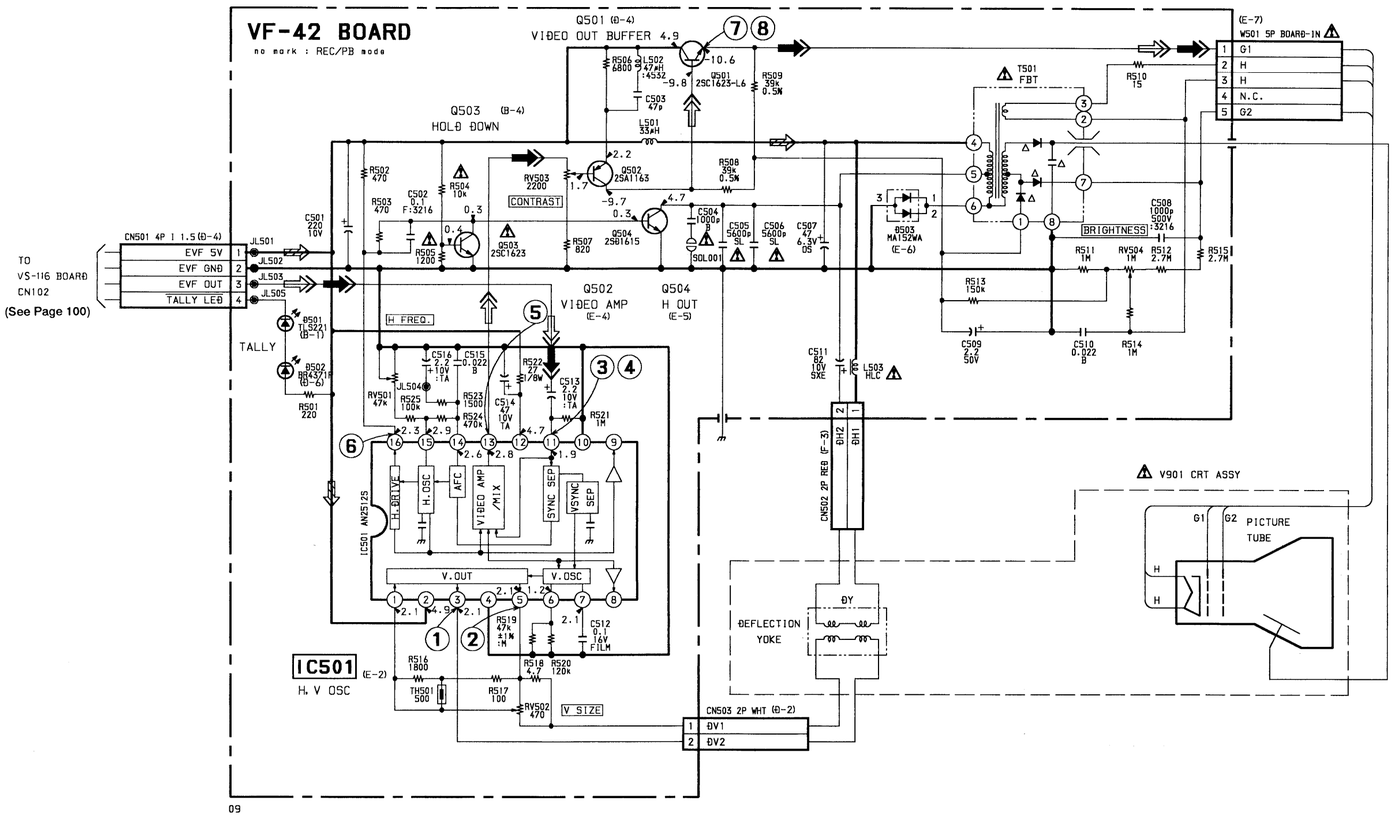


VF-42 BOARD



VF-42 (VIEW FINDER) SCHEMATIC DIAGRAM

— Ref. No. VF-42 BOARD: 1000 series —



Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safty. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piéce portant le numéro spécifié.

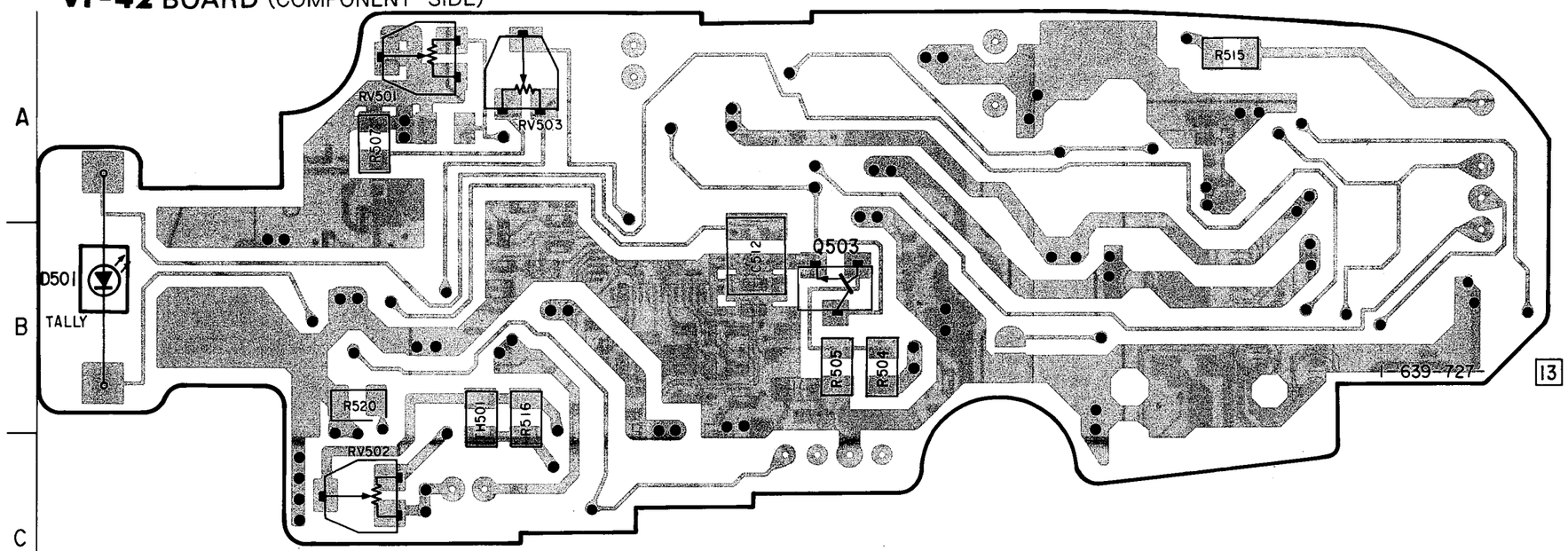
• **SIGNAL PATH**

	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC		⇒	
PB		⇨	

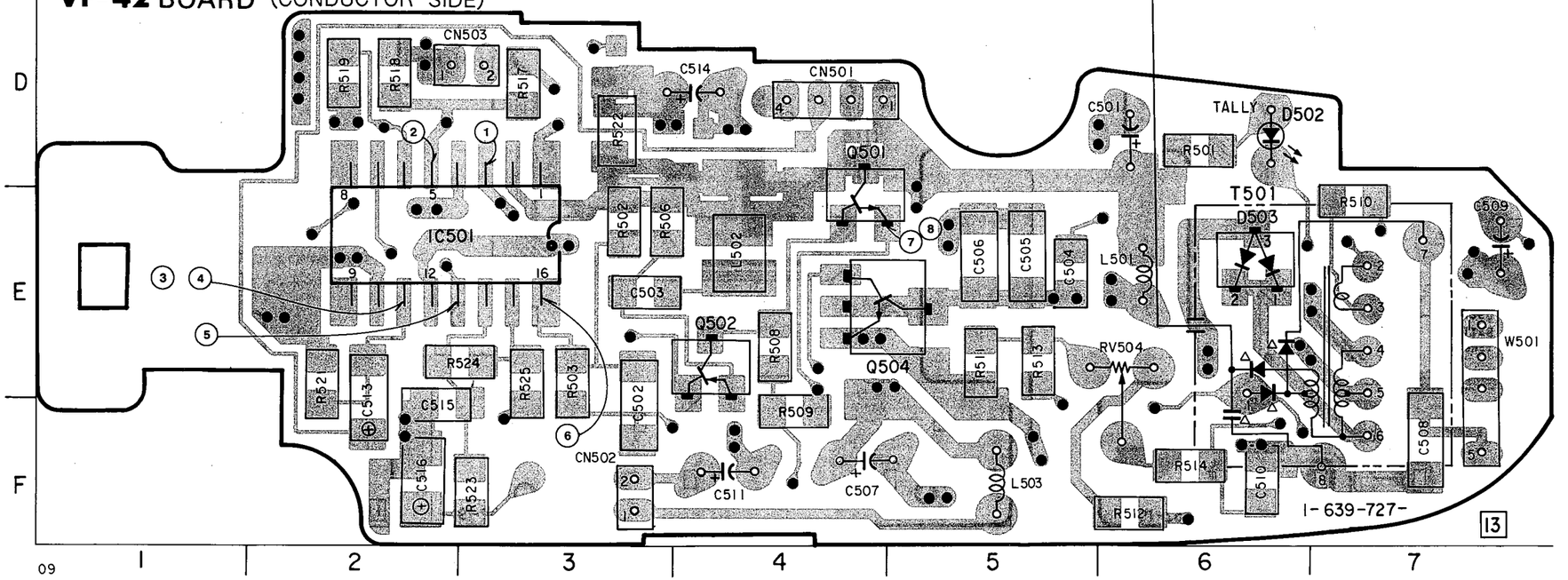
VF-42 (VIEW FINDER) PRINTED WIRING BOARD

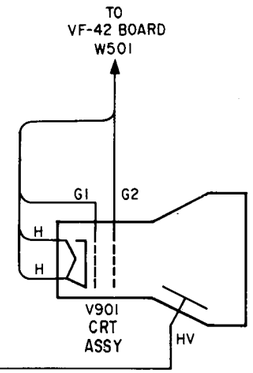
— Ref. No. VF-42 BOARD: 1000 series —

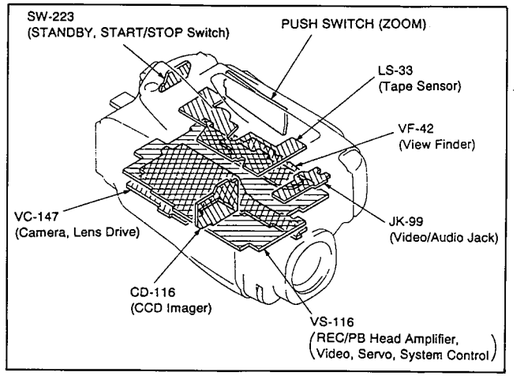
VF-42 BOARD (COMPONENT SIDE)



VF-42 BOARD (CONDUCTOR SIDE)





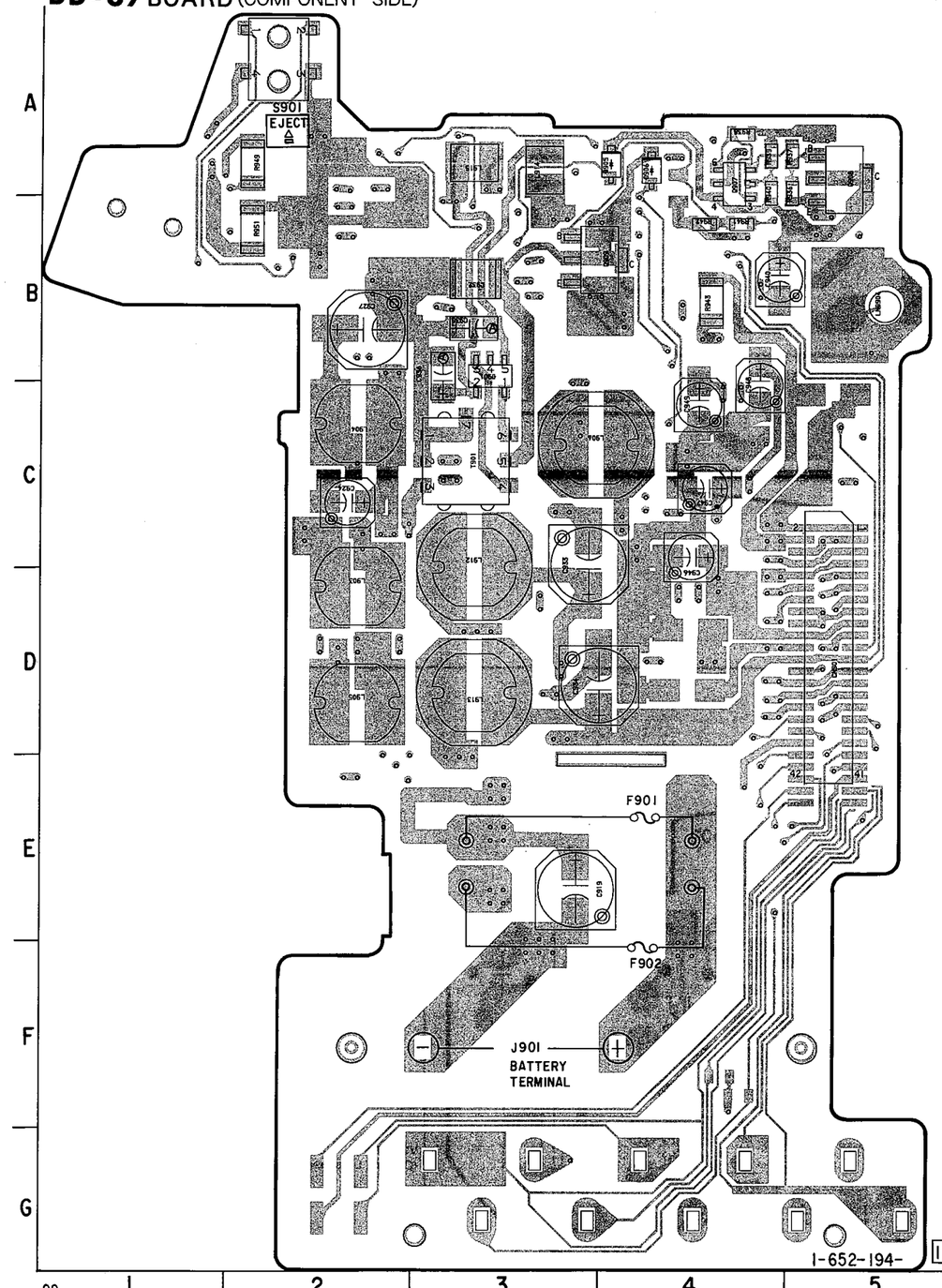


VIEW FINDER

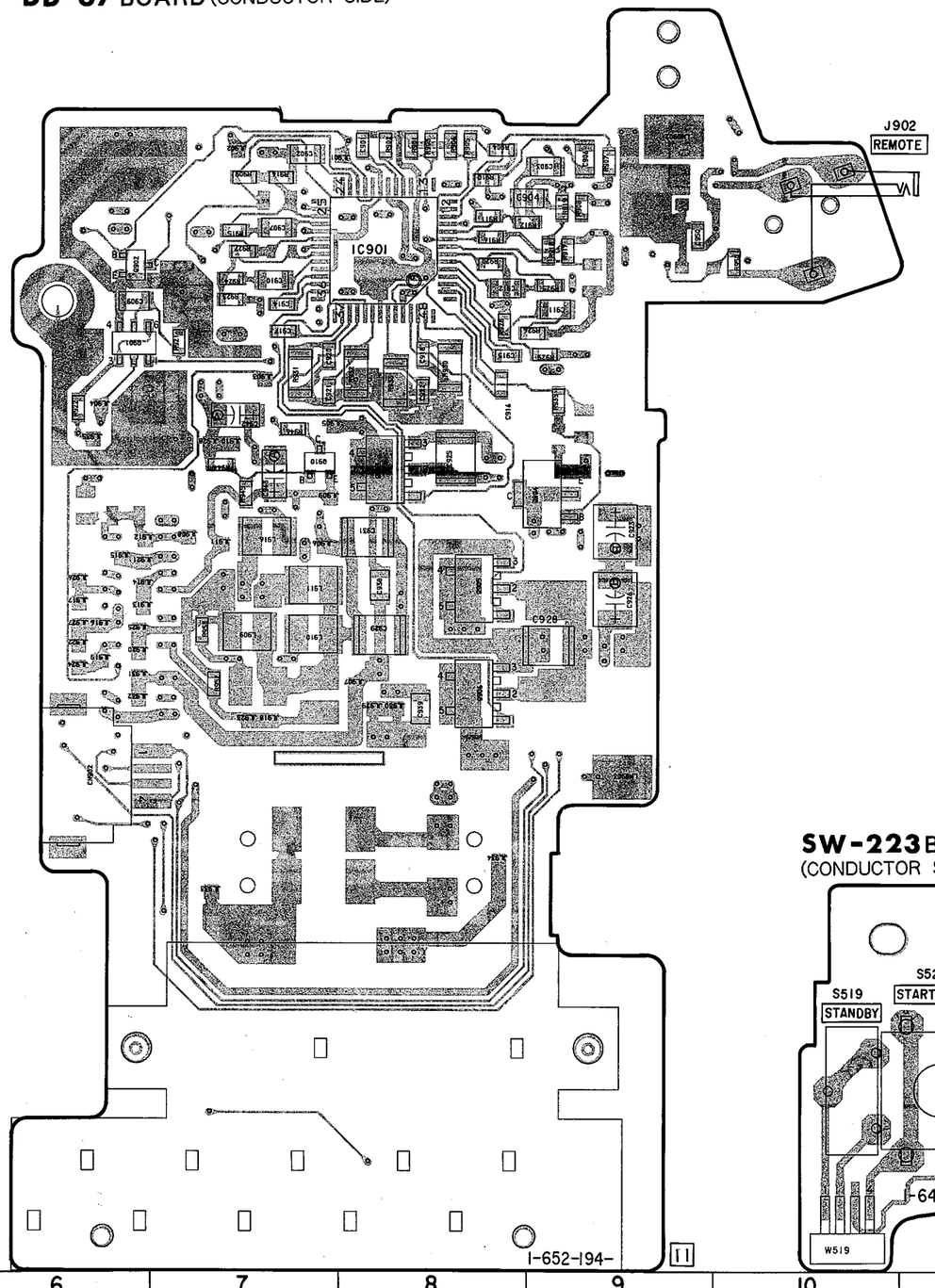
DD-67 (POWER), SW-223 (STANDBY, START/STOP SWITCH) PRINTED WIRING BOARDS

— Ref. No. DD-67 BOARD: 1000 series, SW-223 BOARD: 7000 series —

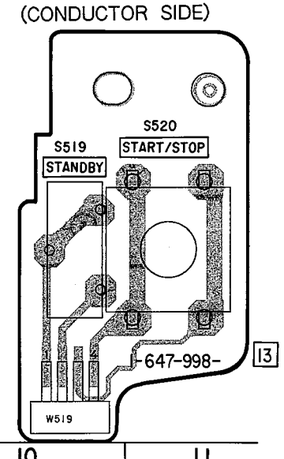
DD-67 BOARD (COMPONENT SIDE)



DD-67 BOARD (CONDUCTOR SIDE)



SW-223 BOARD (CONDUCTOR SIDE)



POWER

DD-67 (POWER), SW-223 (STANDBY, START/STOP SWITCH) SCHEMATIC DIAGRAM

— Ref. No. DD-67 BOARD: 1000 series, SW-223 BOARD: 7000 series —

SW-223 BOARD

DD-67 BOARD

IC901 (B-8)
8C/8C CONVERTER
DRUM/CAPSTAN
PWM DRIVE

Q904 (C-8)
SWITCHING

Q907 (B-4)
8V SWITCH

Q908 (A-5)
4V REG

Q909 (B-4)
CAM 5V SWITCH

Q910 (C-7)
EMERGENCY
DETECT

Q902
SWITCH
(B-6)

Q903 (C-8)
SWITCHING

Q905
(D-8)
DRUM
PWM
DRIVE

Q906 (D-8)
CAPSTAN
PWM
DRIVE

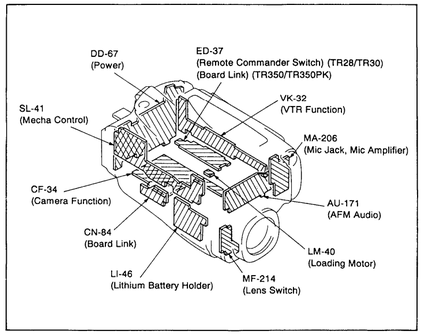
Q901
BUFFER
(B-6)

TO
VS-116 BOARD
CN404

(See Page 104)

·SIGNAL PATH

	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)		▶▶	
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)		▶▶	
Ref. signal			



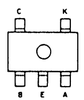
Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safty.
Replace only with part number specified.

Note:
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

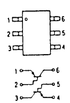
4-3. SEMICONDUCTORS

DTA114EE
DTC124EE
RN1302
RN2302
UN511E
UN5112
UN5113
UN5115
UN521E
UN5212
UN5213
UN9111
2SA1162
2SA1163-G
2SA1576-R
2SA1586
2SA1622-5.6.7
2SA1774R
2SB1202FAST
2SB1295-UL6
2SB1462Q
2SB1574
2SC1623
2SC2223-F13
2SC4178-F14
2SC4211-5.6.7
2SC4617
2SD1819A-R
2SD2216Q

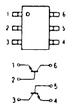
FP101
FP102



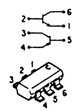
UMT1
XP4401



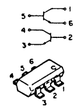
UMX1
XP4501



UMZ1
XN4312



XN4213
XN4215
XN4501



2SB1121
2SB1122-S
2SB798-DL
2SD1615A-GP

2SK1875

FC805

MA110
1SS332

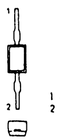
MA142WA
MA152WA
1SS181

MA142WK

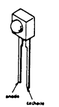
MA728
MA8082

1SS123
1SS226

TLS221



BR4371F



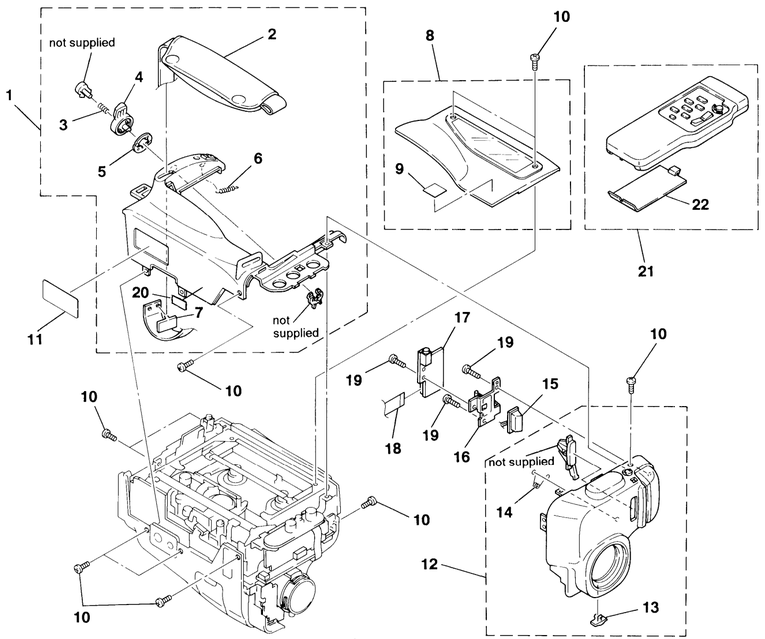
SECTION 5
EXPLODED VIEWS

NOTE:
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Canadian model is abbreviated as CND.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

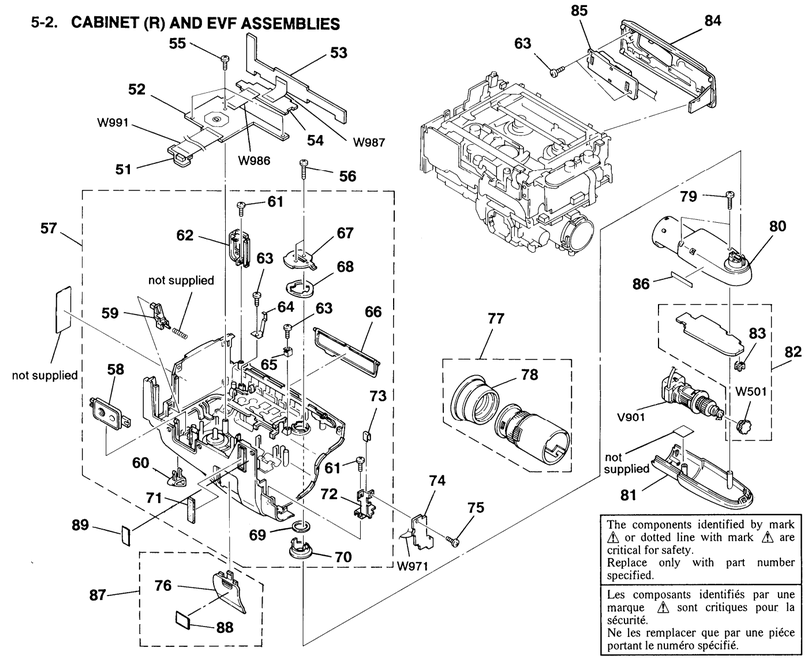
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

5-1. CABINET (L) AND FRONT PANEL ASSEMBLIES



Ref.No.	Part No.	Description	Remark
1	X-3941-893-1	CABINET (L) ASSY (TR30:US)	
1	X-3942-282-1	CABINET (L) ASSY (TR30:CND/TR350/TR350PK)	
1	X-3944-046-1	CABINET (L) ASSY (TR28)	
2	3-736-807-01	BELT, GRIP	
3	3-578-221-00	SPRING, COMPRESSION	
4	3-942-985-01	KNOB, STAND-BY	
5	3-736-364-01	SPRING	
6	4-602-490-00	SPRING, TENSION	
7	3-942-895-01	STOPPER, BELT	
8	X-3944-041-1	LID ASSY, CASSETTE (TR350/TR350PK)	
8	X-3944-042-1	LID ASSY, CASSETTE (TR28)	
8	X-3944-049-1	LID ASSY, CASSETTE (TR30)	
9	3-703-710-41	STICKER, SONY SYMBOL (12)	
10	3-719-381-01	SCREW (M2X4)	
* 11	3-958-102-01	LABEL, MODEL NUMBER (U/C)(TR30)	
* 11	3-958-105-01	LABEL, MODEL NUMBER (E) (TR350/TR350PK)	
* 11	3-958-284-01	LABEL, MODEL NUMBER (U/C)(TR28)	
12	X-3943-990-1	PANEL ASSY, FRONT (TR350/TR350PK)	
12	X-3944-047-1	PANEL ASSY, FRONT (TR28)	
12	X-3944-050-1	PANEL ASSY, FRONT (TR30)	
13	3-942-905-01	KNOB, S	
14	3-947-357-01	SPRING, TORSION	
15	A-7091-800-A	MICROPHONE UNIT	
* 16	3-949-000-01	RETAINER, MICROPHONE	
* 17	A-7063-970-A	MA-206 BOARD, COMPLETE	
18	1-696-487-11	CABLE, FLAT (FFC-90)	
19	3-713-790-21	SCREW (M2X6), TAPPING, P3	
* 20	3-704-367-01	LABEL (TR28/TR30:US)	
21	1-467-574-21	REMOTE COMMANDER (RMT-708) (TR28/TR30)	
22	3-958-131-01	LID, BATTERY CASE (for RMT-708)(TR28/TR30)	

5-2. CABINET (R) AND EVF ASSEMBLIES

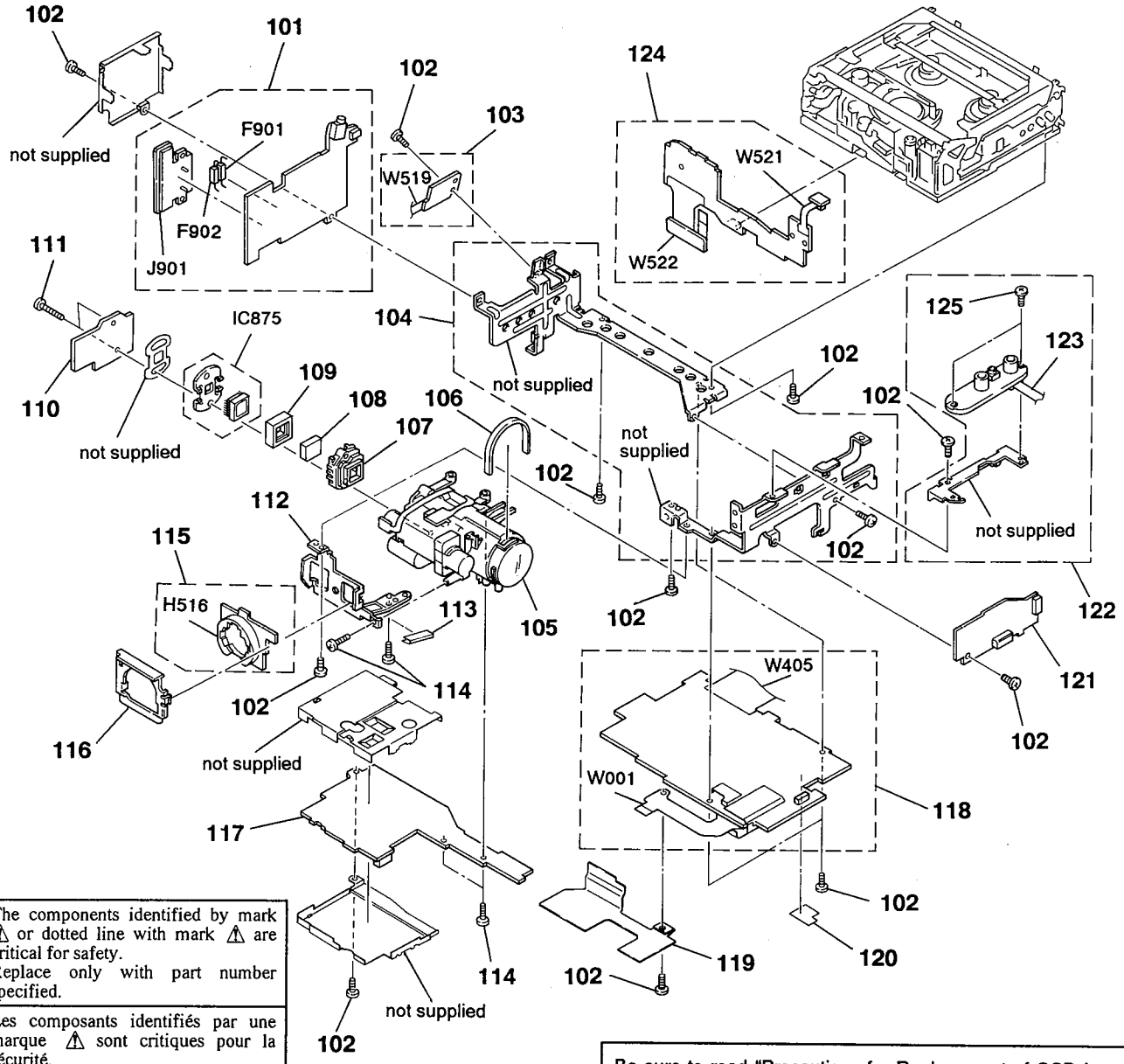


The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

Ref.No.	Part No.	Description	Remark
* 51	A-7072-008-A	CN-84 BOARD, COMPLETE	
* 52	A-7072-012-A	CP-34PLL BOARD, COMPLETE	
* 53	A-7072-010-A	VK-32LL BOARD, COMPLETE	
* 54	A-7072-013-A	ED-37PLL BOARD, COMPLETE (TR350/TR350PK)	
* 54	A-7072-015-A	ED-37LL BOARD, COMPLETE (TR28/TR30)	
55	3-713-790-21	SCREW (M2X6), TAPPING, P3	
56	3-740-546-41	SCREW (M2X10)	
57	X-3943-991-1	CABINET (R) ASSY (TR350/TR350PK)	
57	X-3944-048-1	CABINET (R) ASSY (TR28)	
57	X-3944-051-1	CABINET (R) ASSY (TR30)	
58	3-942-911-01	SCREW, TRIPOD	
59	3-948-990-01	LOCK, BATTERY	
60	3-948-989-01	KNOB, BATTERY (TR30/TR350/TR350PK)	
60	3-948-989-21	KNOB, BATTERY (TR28)	
61	4-908-792-71	SCREW (B2X6), TAPPING, P1	
62	3-948-975-51	BASE, POWER (TR30/TR350/TR350PK)	
62	3-948-975-61	BASE, POWER (TR28)	
63	3-719-601-01	SCREW (B2X5), TAPPING	
64	3-948-988-01	SPRING, LEAF, VK	
65	3-747-178-01	REINFORCEMENT, TILT LOCK	
66	3-948-976-01	DOOR, CONTROL (TR30/TR350/TR350PK)	
66	3-948-976-21	DOOR, CONTROL (TR28)	
67	3-747-111-01	PLATE, LOCK, TILT	
68	3-747-110-01	SPRING, LEAF, TILT	
69	3-747-112-01	RING, TILT	
70	3-747-109-01	SLEEVE, EVF	
71	3-949-008-01	SHEET, FOOT	
* 72	3-948-987-01	FRAME, MF	
73	2-532-810-00	CUSHION, 15X5X0.3	
* 74	A-7072-009-A	MF-214W BOARD, COMPLETE	
75	3-713-786-51	SCREW (M2X3)	
76	3-948-843-01	LID, BATTERY CASE, LITHIUM (TR30/TR350/TR350PK)	
77	X-3941-603-1	HOLDER ASSY, FINDER	
78	3-946-426-01	EYE CUP	
79	3-713-790-31	SCREW (M2X8), TAPPING, P3	
80	X-3940-706-1	CABINET (L) ASSY, EVF (TR30/TR350/TR350PK)	
80	X-3944-045-1	CABINET (L) ASSY, EVF (TR28)	
81	3-943-077-01	CABINET (R), EVF (TR30/TR350/TR350PK)	
81	3-952-073-31	CABINET (R), EVF (TR28)	
* 82	A-7063-183-A	VF-42 BOARD, COMPLETE (3120)	
83	3-942-888-01	HOLDER, LED	
84	X-3941-894-1	LID ASSY, LS (TR30/TR350/TR350PK)	
84	X-3944-044-1	LID ASSY, LS (TR28)	
85	1-692-257-11	SWITCH, PUSH (ZOOM)	
* 86	3-744-894-11	LABEL, EVF	
87	X-3942-113-1	LID ASSY, BATTERY, LITHIUM (TR30:US)	
87	X-3944-043-1	LID ASSY, BATTERY, LITHIUM (TR28)	
88	3-704-256-01	LABEL, CAUTION (TR28/TR30:US)	
89	3-954-355-01	LABEL (C), NI-CD RECYCLE (TR28/TR30)	
⚠V901	1-452-565-11	CRT ASSY (M01KKD70WB)	
⚠W501	1-540-019-21	SOCKET ASSY, CRT	
W971	1-696-484-11	CABLE, FLAT (FFC-87)	
W986	1-696-621-11	FP-590 FLEXIBLE BOARD	
W987	1-696-622-11	FP-591 FLEXIBLE BOARD	
W991	1-696-483-11	CABLE, FLAT (FFC-86)	

5-3. MAIN BOARDS ASSEMBLY



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

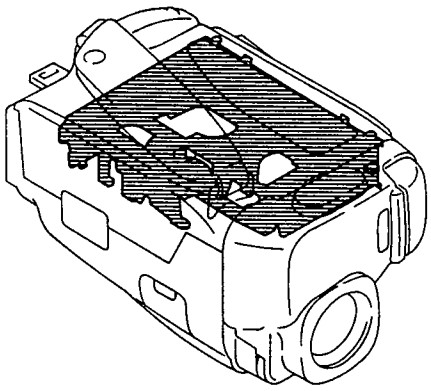
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

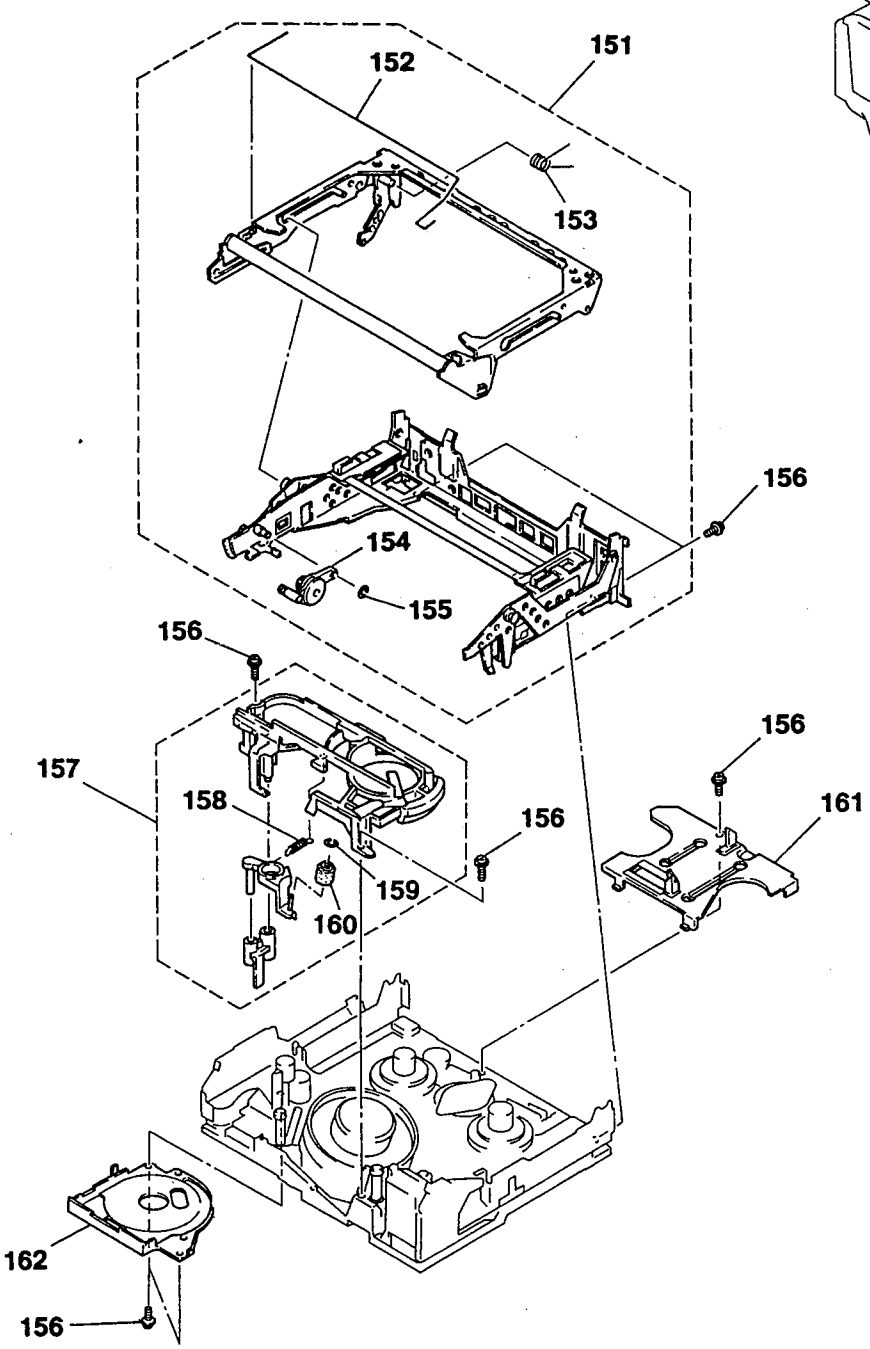
Be sure to read "Precautions for Replacement of CCD Imager" on page 76 when changing the CCD imager.

Ref. No.	Part No.	Description	Remark
⚠*101	A-7063-968-A	DD-67 BOARD, COMPLETE	
102	3-713-786-51	SCREW (M2X3)	
* 103	A-7071-828-A	SW-223 BOARD, COMPLETE	
* 104	X-3942-209-1	FRAME (UPPER LOWER) ASSY	
105	1-547-548-11	LENS, ZOOM (VCL-6210WC) (TYPE A)	
105	1-547-630-11	LENS, ZOOM (VCL-6210WF) (TYPE B)	
106	3-954-580-01	CUSHION, LENS	
107	3-946-856-01	ADAPTOR (H), CCD FITTING	
108	1-547-558-21	FILTER BLOCK, OPTICAL	
109	3-946-857-01	RUBBER (S), SEAL	
* 110	A-7063-963-A	CD-116 BOARD, COMPLETE	
111	3-947-268-01	SCREW (B TIGHT) (2), TAPPING	
* 112	3-949-001-01	FRAME, LENS	
113	3-846-312-01	SPACER	
114	3-719-601-01	SCREW (B2X5), TAPPING	
* 115	A-7071-829-A	LI-46 BOARD, COMPLETE	
116	3-948-842-01	HOLDER, LI	
* 117	A-7063-965-A	VC-147 BOARD, COMPLETE	
* 118	A-7066-014-A	VS-116LL BOARD, COMPLETE (TR28/TR30)	

Ref. No.	Part No.	Description	Remark
* 118	A-7066-020-A	VS-116NL BOARD, COMPLETE (TR350/TR350PK)	
119	3-957-512-01	SHIELD, SL	
* 120	3-954-411-01	SHEET (VS/LE), INSULATING	
* 121	A-7066-004-A	AU-171NL BOARD, COMPLETE (TR350/TR350PK)	
* 121	A-7066-013-A	AU-171LL BOARD, COMPLETE (TR28/TR30)	
* 122	A-7066-021-A	JK-99LL BOARD, COMPLETE	
123	1-751-814-11	CABLE, FLAT (FFC-124)	
* 124	A-7063-967-A	SL-41 BOARD, COMPLETE	
125	3-719-381-01	SCREW (M2X4)	
H516	1-550-104-32	HOLDER, BATTERY	
IC875	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE) (CCD IMAGER)	
J901	1-537-281-41	TERMINAL BOARD	
W001	1-696-489-11	FP-588 FLEXIBLE BOARD	
W405	1-644-285-11	FP-572 FLEXIBLE BOARD	
W519	1-696-488-11	CABLE, FLAT (FFC-92)	
W521	1-642-186-11	FP-437 FLEXIBLE BOARD	
W522	1-696-490-11	FP-589 FLEXIBLE BOARD	

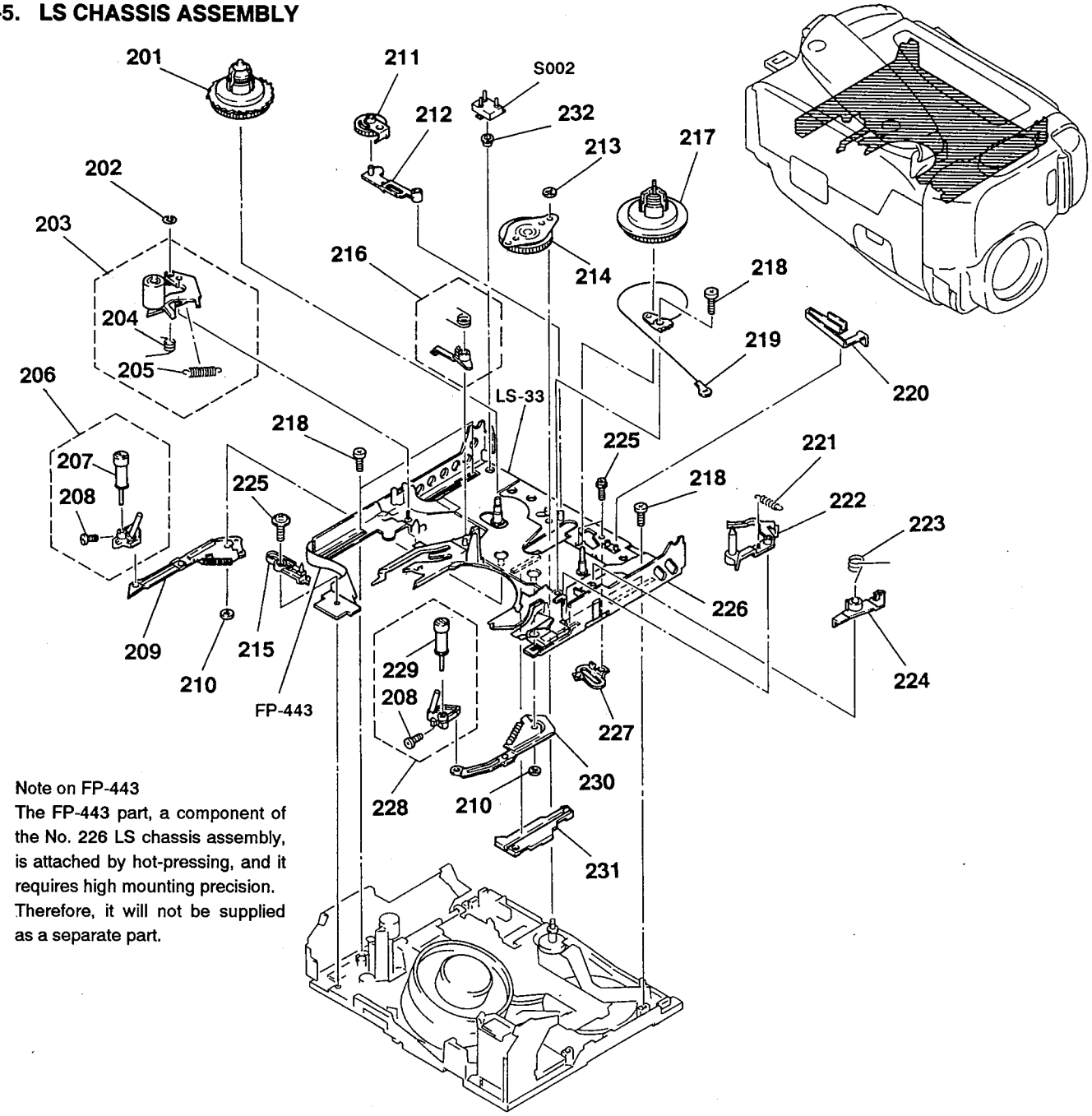
5-4. CASSETTE COMPARTMENT ASSEMBLY





Ref. No.	Part No.	Description	Remark
151	A-7040-312-K	CASSETTE COMPARTMENT BLOCKASSY	
152	3-945-773-01	BAR, TORSION	
153	3-945-771-01	SPRING, TORSION	
154	X-3941-287-2	DAMPER ASSY	
155	3-315-384-31	WASHER, STOPPER	
156	3-947-503-01	SCREW (M1.4X2.5)	
157	A-7040-309-A	PROTECT (BASE) BLOCK ASSY	
158	3-945-760-01	SPRING, TENSION	
159	3-321-393-01	WASHER, STOPPER	
160	X-3166-813-1	ROLLER ASSY, HC	
161	X-3941-280-1	RETAINER ASSY, GOOSENECK	
162	3-945-733-01	COVER, CAPSTAN	

5-5. LS CHASSIS ASSEMBLY

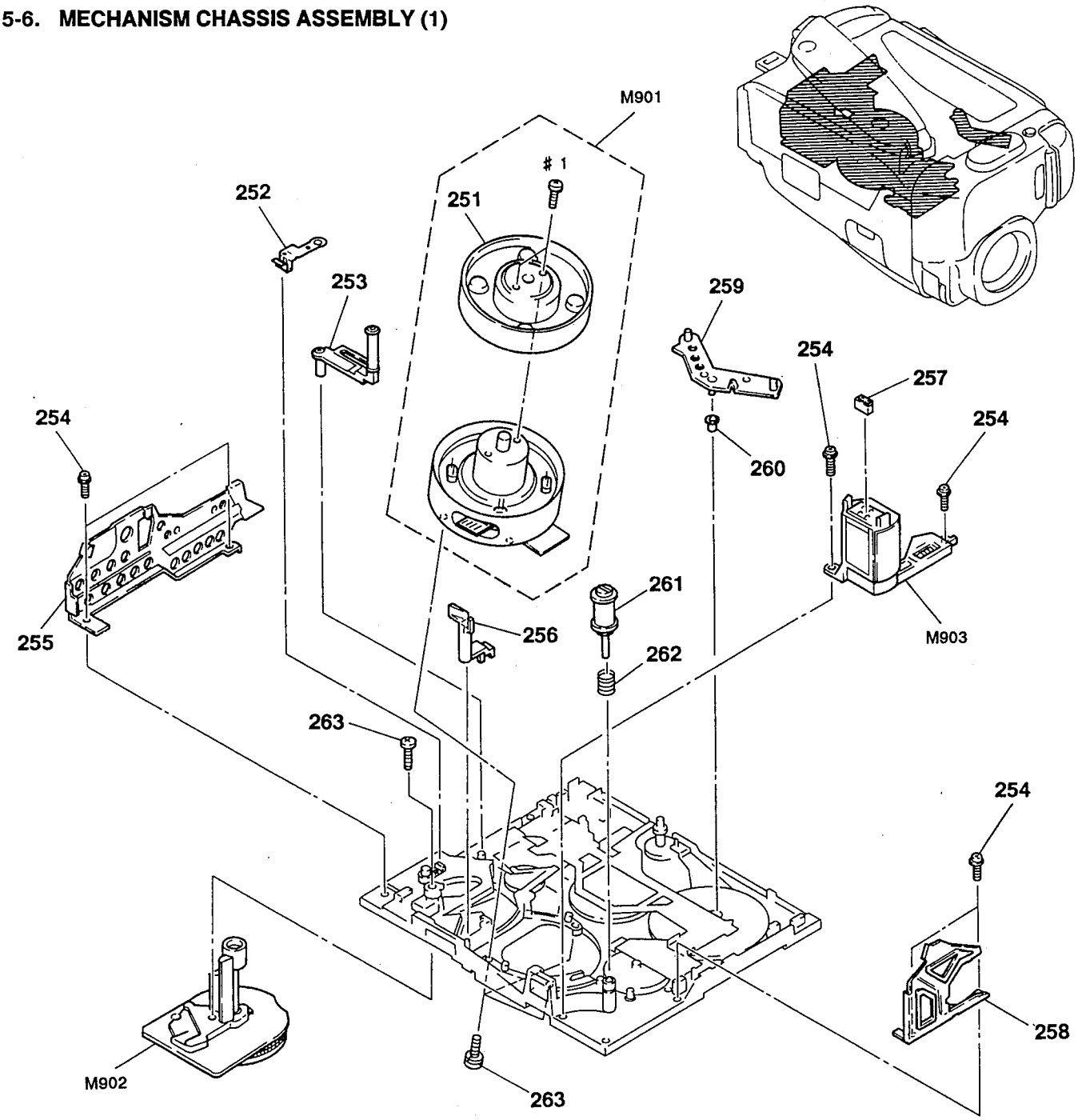


Note on FP-443
The FP-443 part, a component of the No. 226 LS chassis assembly, is attached by hot-pressing, and it requires high mounting precision. Therefore, it will not be supplied as a separate part.

Ref. No.	Part No.	Description	Remark
201	X-3941-274-1	TABLE ASSY, REEL, T	
202	3-331-007-21	WASHER	
203	X-3941-271-5	ARM ASSY, PINCH	
204	3-945-743-01	SPRING, TORSION	
205	3-945-783-01	SPRING, TENSION	
206	A-7040-307-A	GUIDE (BASE) (T) BLOCK ASSY	
207	X-3941-424-1	ROLLER ASSY, TG6	
208	3-947-504-01	SCREW (M1.2X2)	
209	X-3941-267-1	ARM (T) ASSY, GUIDE	
210	3-669-465-00	WASHER (1.5), STOPPER	
211	X-3941-273-1	SOFT ASSY, T	
212	3-945-753-01	ARM, T SOFT	
213	3-726-829-01	WASHER, STOPPER	
214	X-3941-279-5	GEAR ASSY, GOOSENECK	
215	3-947-644-01	RETAINER, TG5 (BASE)	
216	A-7040-321-A	CLAW BLOCK ASSY, T HARD	
217	X-3943-676-1	TABLE ASSY, S REEL	

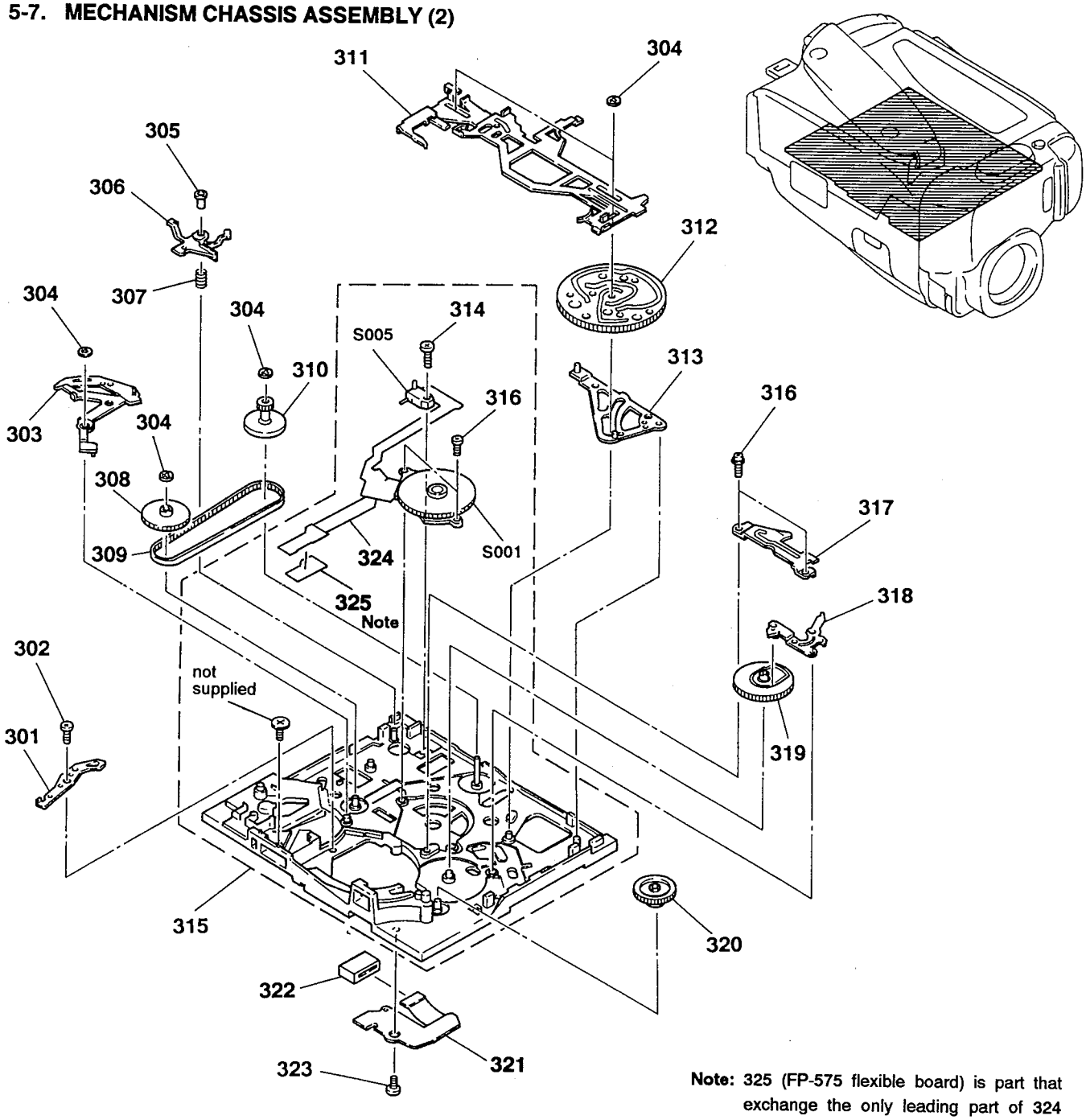
Ref. No.	Part No.	Description	Remark
218	3-945-756-01	SCREW (M1.4X3)	
219	X-3941-277-1	STRING BLOCK ASSY	
220	3-945-801-01	BRAKE, S SOFT	
221	3-954-327-01	SPRING, TENSION	
222	X-3941-276-1	TG1 ASSY	
223	3-945-752-01	SPRING, TORSION	
224	3-945-799-01	BRAKE, S HARD	
225	3-947-503-01	SCREW (M1.4X2.5)	
226	X-3943-307-1	CHASSIS ASSY, LS	
227	3-945-784-01	PLATE, CAM, LS	
228	A-7040-306-A	GUIDE (BASE) (S) BLOCK ASSY	
229	X-3941-269-1	ROLLER ASSY, TG3	
230	X-3941-266-1	ARM (S) ASSY, GUIDE	
231	3-945-837-01	SLIDER, GL	
232	3-949-881-01	SLEEVE	
S002	1-572-987-11	SWITCH, PUSH (3 KEY) (REC PROOF, ME/MP, MP/MP-HG)	

5-6. MECHANISM CHASSIS ASSEMBLY (1)



Ref. No.	Part No.	Description	Remark
251	A-7049-501-A	DRUM ASSY, UPPER (DGR-78-R)	
252	3-945-822-01	SPRING, LEAF, TG7 ARM	
253	A-7040-305-A	ARM BLOCK ASSY, TG7	
254	3-947-503-01	SCREW (M1.4X2.5)	
255	X-3941-255-1	PLATE (T) ASSY, SIDE	
256	3-945-735-01	ARM, HC CONVERSION	
257	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
258	3-945-691-01	PLATE (S), SIDE	
259	3-945-701-01	ARM, LS	
260	3-945-702-01	ROLLER, LS	
261	X-3941-262-1	ROLLER ASSY, TG2	
262	3-956-651-01	SPRING, COMPRESSION	
263	3-686-493-01	SCREW (M2X5), P1	
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)	
M902	8-835-477-01	MOTOR, DC SCE-0101A (CAPSTAN)	
M903	A-7040-304-A	MOTOR BLOCK ASSY, LM (LOADING)	

5-7. MECHANISM CHASSIS ASSEMBLY (2)

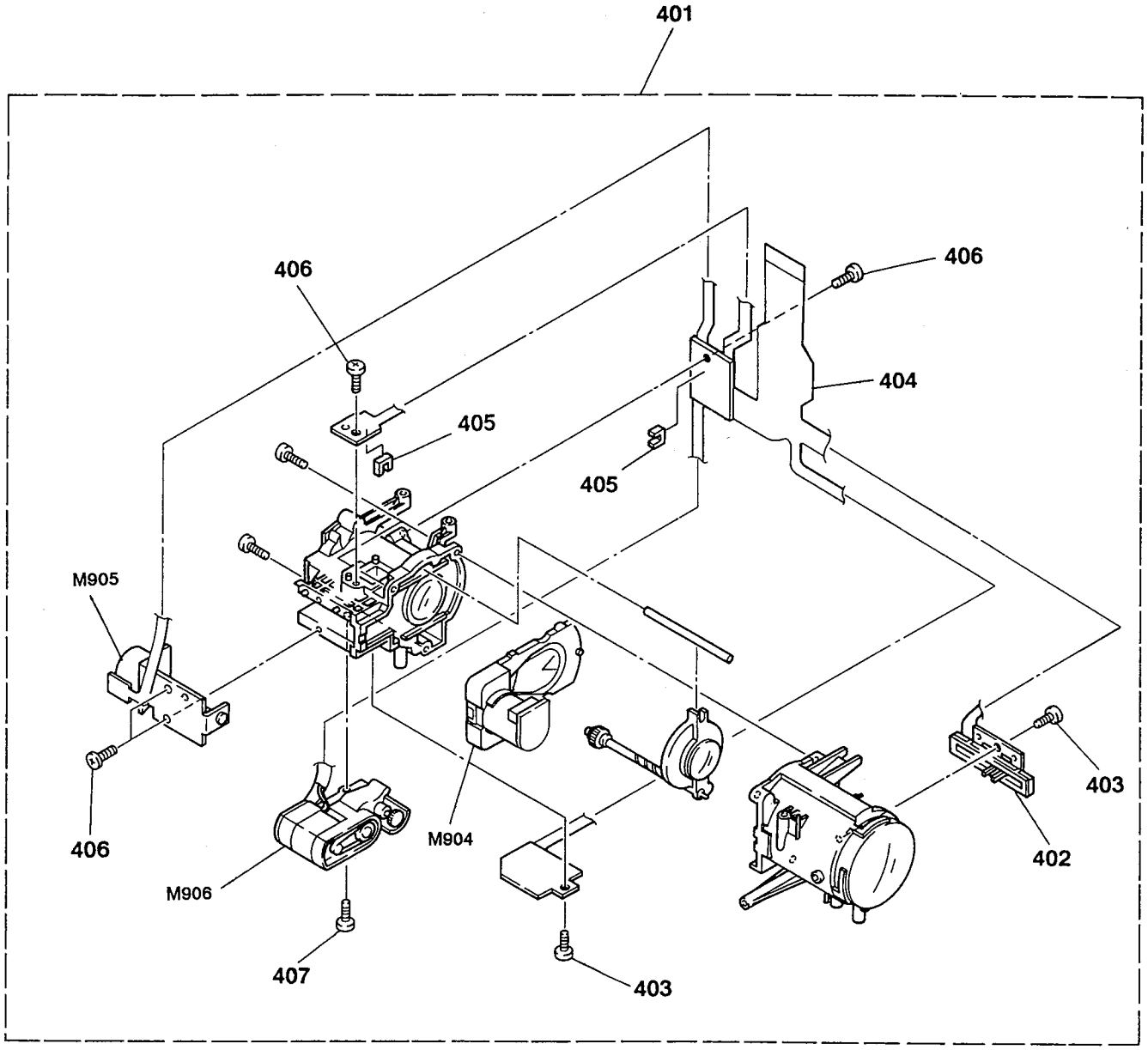


Note: 325 (FP-575 flexible board) is part that exchange the only leading part of 324 (FP-442 flexible board).

Ref. No.	Part No.	Description	Remark
301	3-945-734-01	ARM, HC DRIVING	
302	3-728-103-11	SCREW (M1.4X1.6), SPECIAL HEAD	
303	X-3941-259-1	ARM ASSY, PINCH PRESS	
304	3-726-829-01	WASHER, STOPPER	
305	3-945-730-01	SLEEVE, EJECT	
306	3-945-706-01	LEVER, EJECT	
307	3-945-729-01	SPRING, COMPRESSION	
308	X-3941-256-1	GEAR ASSY, CHANGE	
309	3-944-539-01	BELT, RELAY	
310	3-945-695-01	PULLEY, RELAY	
311	X-3941-260-1	SLIDER ASSY, M	
312	3-945-696-02	CAM	
313	X-3941-258-3	ARM ASSY, GL	
314	3-713-786-71	SCREW (M2X5)	

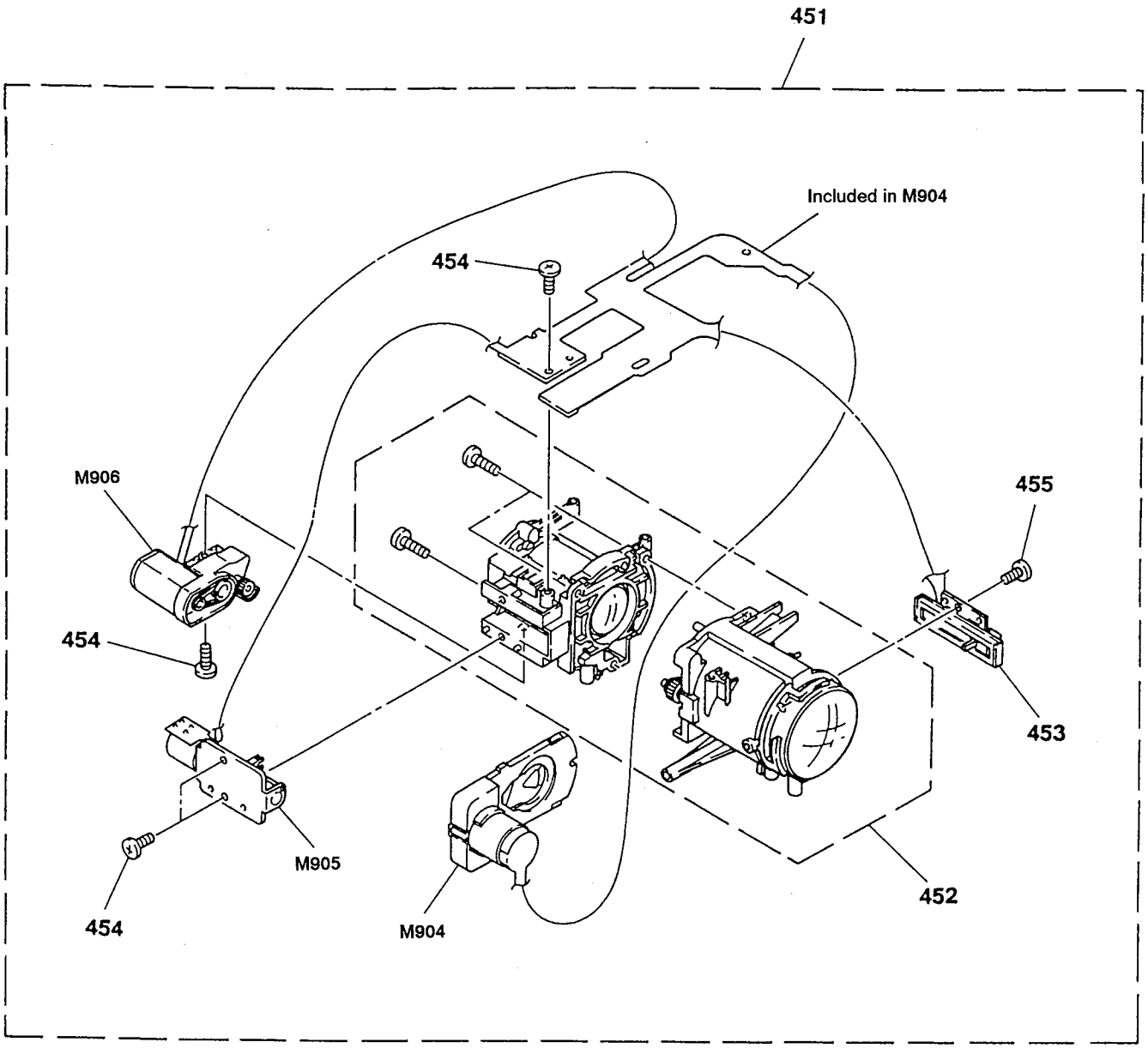
Ref. No.	Part No.	Description	Remark
315	A-7040-303-A	CHASSIS ASSY, MECHANICAL	
316	3-947-503-01	SCREW (M1.4X2.5)	
317	3-945-722-01	RETAINER, GEAR	
318	X-3941-257-1	ARM ASSY, FF	
319	3-945-697-01	GEAR (B), L	
320	3-945-700-01	GEAR (A), L	
321	1-641-643-12	FP-444 FLEXIBLE BOARD	
322	1-691-254-13	CONNECTOR, TRANSLATION 10P	
323	3-945-756-01	SCREW (M1.4X3)	
324	1-641-639-13	FP-442 FLEXIBLE BOARD	
325	1-645-271-11	FP-575 FLEXIBLE BOARD	
S001	1-572-986-11	SWITCH, ROTARY (ENCODER)	
S005	1-570-771-21	SWITCH (C DOWN)	

5-8. ZOOM LENS ASSEMBLY (VCL-6210WC) (TYPE A)



Ref. No.	Part No.	Description	Remark
401	1-547-548-11	LENS, ZOOM (VCL-6210WC) (TYPE A)	
402	3-708-446-01	METER, POTENTIAL	
403	3-708-053-01	SCREW, FB FITTING	
404	3-708-493-11	FLEXIBLE	
405	3-708-435-01	PHOTO INTERRUPTER	
406	3-707-946-01	SCREW	
407	3-708-450-01	SCREW, PZ	
M904	3-708-494-11	METER ASSY, IG (IRIS) (TYPE A)	
M905	3-708-491-01	MOTOR ASSY, STEPPING (FOCUS) (TYPE A)	
M906	3-708-492-01	MOTOR ASSY, PZ (ZOOM) (TYPE A)	

5-9. ZOOM LENS ASSEMBLY (VCL-6210WF) (TYPE B)



Ref. No.	Part No.	Description	Remark
451	1-547-630-11	LENS, ZOOM (VCL-6210WF) (TYPE B)	
452	3-708-652-01	LENS ASSY	
453	3-708-655-01	POTENTIO, ZOOM	
454	3-708-302-01	SCREW, FITTING M.E	
455	3-708-657-01	SCREW, POTENTIOMETER FITTING	
M904	3-708-653-01	IRIS UNIT (TYPE B)	
M905	3-708-656-01	MOTOR UNIT, FOCUS (TYPE B)	
M906	3-708-654-01	MOTOR UNIT, ZOOM (TYPE B)	

SECTION 6
ELECTRICAL PARTS LIST

AU-171 **CD-116**

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- Hardware (# mark) list is given in the last of this parts list.
- Canadian model is abbreviated as CND.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: μ , for example:
  uA...: μA..., uPA...: μPA...,
  uPB...: μPB..., uPC...: μPC...,
  uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH

Ref.No.	Part No.	Description			Remark
*	A-7066-004-A	AU-171 BOARD, COMPLETE (TR350/TR350PK)			
		**********			
*	A-7066-013-A	AU-171 BOARD, COMPLETE (TR28/TR30)			
		**********			
		(Ref. No. 2,000 Series)			
		< CAPACITOR >			
C601	1-126-607-11	ELECT CHIP	47uF	20%	4V
C605	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C607	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C614	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C615	1-164-373-11	CERAMIC CHIP	0.033uF		25V
C617	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C618	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C627	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C628	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C629	1-126-607-11	ELECT CHIP	47uF	20%	4V
C630	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C631	1-128-006-11	ELECT CHIP	4.7uF	20%	25V
C632	1-162-951-11	CERAMIC CHIP	68PF	5%	50V
C636	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C637	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C639	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C640	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C641	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C643	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C645	1-128-006-11	ELECT CHIP	4.7uF	20%	25V
C647	1-128-013-11	ELECT CHIP	1uF	20%	50V
C649	1-128-004-11	ELECT CHIP	10uF	20%	16V
C651	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C654	1-162-977-11	CERAMIC CHIP	0.0018uF	10%	50V
C655	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C657	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C660	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C691	1-128-006-11	ELECT CHIP	4.7uF	20%	25V
C695	1-128-006-11	ELECT CHIP	4.7uF	20%	25V
C699	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
		< CONNECTOR >			
CN601	1-566-537-11	CONNECTOR, FPC (NON ZIF) 5P			
CN602	1-573-338-11	CONNECTOR, BOARD TO BOARD 20P			
CN604	1-566-537-11	CONNECTOR, FPC (NON ZIF) 5P			
		< IC >			
IC601	8-759-823-19	IC CXA1488R			
IC602	8-749-923-29	IC RS-20E-T (TR28/TR30)			
		< COIL >			
L601	1-410-384-31	INDUCTOR CHIP 18uH			
		< RESISTOR >			
R603	1-216-851-11	METAL CHIP	330K	5%	1/16W
R604	1-216-837-11	METAL CHIP	22K	5%	1/16W
R605	1-216-849-11	METAL CHIP	220K	5%	1/16W
R607	1-216-859-11	METAL GLAZE	1.5M	5%	1/16W
R609	1-216-833-11	METAL CHIP	10K	5%	1/16W
R614	1-216-817-11	METAL CHIP	470	5%	1/16W
R615	1-216-839-11	METAL CHIP	33K	5%	1/16W
R616	1-216-864-11	METAL CHIP	0	5%	1/16W
R617	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R618	1-216-839-11	METAL CHIP	33K	5%	1/16W
R619	1-216-864-11	METAL CHIP	0	5%	1/16W
R620	1-216-840-11	METAL CHIP	39K	5%	1/16W
R622	1-216-839-11	METAL CHIP	33K	5%	1/16W
R625	1-216-833-11	METAL CHIP	10K	5%	1/16W
R630	1-216-821-11	METAL CHIP	1K	5%	1/16W
R637	1-216-864-11	METAL CHIP	0	5%	1/16W (TR28/TR30)
R659	1-216-841-11	METAL CHIP	47K	5%	1/16W
R677	1-216-832-11	METAL CHIP	8.2K	5%	1/16W
R679	1-216-821-11	METAL CHIP	1K	5%	1/16W
R681	1-216-851-11	METAL CHIP	330K	5%	1/16W
R682	1-216-849-11	METAL CHIP	220K	5%	1/16W
R691	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R692	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R693	1-216-837-11	METAL CHIP	22K	5%	1/16W
**********					
*	A-7063-963-A	CD-116 BOARD, COMPLETE			
		**********			
		(Ref. No. 1,000 Series)			
		< CAPACITOR >			
C875	1-135-214-21	TANTAL. CHIP	4.7uF	20%	20V
C876	1-128-013-11	ELECT CHIP	1uF	20%	50V

Ref. No.	Part No.	Description			Remark
C877	1-128-008-11	ELECT CHIP	3.3uF	20%	35V
C879	1-162-637-11	CERAMIC CHIP	0.47uF		16V
C880	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C881	1-128-004-11	ELECT CHIP	10uF	20%	16V
C882	1-126-607-11	ELECT CHIP	47uF	20%	4V
C883	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C884	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C888	1-135-214-21	TANTAL. CHIP	4.7uF	20%	20V
		< CONNECTOR >			
CN875	1-573-308-11	CONNECTOR, BOARD TO BOARD 16P			
		< DIODE >			
D875	8-719-800-76	DIODE	1SS123		
D876	8-719-404-46	DIODE	MA110		
D877	8-719-820-05	DIODE	1SS181		
D878	8-719-404-46	DIODE	MA110		
		< IC >			
IC875	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE) (CCD IMAGER)			
		< COIL >			
L875	1-412-064-11	INDUCTOR CHIP 100uH			
		< TRANSISTOR >			
Q875	8-729-425-64	TRANSISTOR	2SD2216Q		
Q876	8-729-427-72	TRANSISTOR	XP4501		
Q877	8-729-232-86	TRANSISTOR	2SK1875		
		< RESISTOR >			
R877	1-216-845-11	METAL CHIP	100K	5%	1/16W
R878	1-216-857-11	METAL CHIP	1M	5%	1/16W
R879	1-216-839-11	METAL CHIP	33K	5%	1/16W
R880	1-216-843-11	METAL CHIP	68K	5%	1/16W
R881	1-216-819-11	METAL CHIP	680	5%	1/16W
R882	1-216-849-11	METAL CHIP	220K	5%	1/16W
R883	1-216-835-11	METAL CHIP	15K	5%	1/16W
R884	1-216-850-11	METAL CHIP	270K	5%	1/16W
R885	1-216-833-11	METAL CHIP	10K	5%	1/16W
R886	1-216-809-11	METAL CHIP	100	5%	1/16W
R887	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
**********					
*	A-7072-012-A	CF-34 BOARD, COMPLETE			
		**********			
		(Ref. No. 7,000 Series)			
		< CONNECTOR >			
CN993	1-566-540-11	CONNECTOR, FPC (NON ZIF) 8P			

Be sure to read "Precautions for Replacement of CCD Imager" on page 76 when changing the CCD imager.

Ref. No.	Part No.	Description			Remark
		< DIODE >			
D992	8-719-404-46	DIODE	MA110		
		< RESISTOR >			
R994	1-216-295-00	METAL CHIP	0	5%	1/10W
R996	1-216-295-00	METAL CHIP	0	5%	1/10W
R999	1-216-295-00	METAL CHIP	0	5%	1/10W
		< SWITCH >			
S993	1-692-111-11	SWITCH, KEY BOARD (DATE (+))			
S995	1-692-111-11	SWITCH, KEY BOARD (COUNTER RESET)			
S996	1-692-111-11	SWITCH, KEY BOARD (TIME (NEXT))			
S997	1-692-024-21	SWITCH, ROTARY (POWER)			
		< FLEXIBLE BOARD >			
W986	1-696-621-11	FP-590 FLEXIBLE BOARD			
**********					
*	A-7072-008-A	CN-84 BOARD, COMPLETE			
		**********			
		(Ref. No. 6,000 Series)			
		< CONNECTOR >			
CN518	1-573-310-11	CONNECTOR, BOARD TO BOARD 20P			
		< FLAT CABLE >			
W991	1-696-483-11	CABLE, FLAT (FFC-86)			
**********					
*	A-7063-968-A	DD-67 BOARD, COMPLETE			
		**********			
		(Ref. No. 1,000 Series)			
		< CAPACITOR >			
C901	1-164-218-11	CERAMIC CHIP	180PF	0.25PF	50V
C902	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C903	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C904	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C906	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C907	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C909	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C910	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C911	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C912	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C914	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C915	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C916	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C917	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C918	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V

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Ref.No.	Part No.	Description			Remark
C919	1-128-530-11	ELECT CHIP	33uF	20%	10V
C920	1-162-928-11	CERAMIC CHIP	120PF	5%	50V
C921	1-162-928-11	CERAMIC CHIP	120PF	5%	50V
C922	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C923	1-135-215-21	TANTAL. CHIP	6.8uF	20%	16V
C924	1-128-004-11	ELECT CHIP	10uF	20%	16V
C925	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C926	1-135-215-21	TANTAL. CHIP	6.8uF	20%	16V
C927	1-128-530-11	ELECT CHIP	33uF	20%	10V
C928	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C929	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C931	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C932	1-165-178-11	CERAMIC CHIP	6.8uF		16V
C933	1-128-530-11	ELECT CHIP	33uF	20%	10V
C934	1-128-530-11	ELECT CHIP	33uF	20%	10V
C935	1-135-177-21	TANTALUM CHIP	1uF	20%	20V
C936	1-135-177-21	TANTALUM CHIP	1uF	20%	20V
C938	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C939	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C940	1-128-004-11	ELECT CHIP	10uF	20%	16V
C942	1-135-177-21	TANTALUM CHIP	1uF	20%	20V
C943	1-135-177-21	TANTALUM CHIP	1uF	20%	20V
C946	1-128-004-11	ELECT CHIP	10uF	20%	16V
C947	1-128-004-11	ELECT CHIP	10uF	20%	16V
C948	1-128-004-11	ELECT CHIP	10uF	20%	16V
C949	1-128-004-11	ELECT CHIP	10uF	20%	16V
C950	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
		< CONNECTOR >			
CN901	1-695-324-11	CONNECTOR, BOARD TO BOARD 42P			
CN902	1-573-506-41	CONNECTOR, FPC (NON ZIF) 4P			
		< DIODE >			
D901	8-719-981-59	DIODE FC805			
D905	8-719-404-46	DIODE MA110			
D906	8-719-404-46	DIODE MA110			
		< FUSE >			
⚠F901	1-532-778-21	FUSE, MICRO 1.6A 125V			
⚠F902	1-532-778-21	FUSE, MICRO 1.6A 125V			
		< IC >			
IC901	8-759-060-94	IC MB3785APFV-G-BND-ER			
		< JACK >			
J901	1-537-281-41	TERMINAL BOARD (BATTERY TERMINAL)			
J902	1-565-276-21	JACK, ULTRA SMALL 1P (REMOTE)			

Ref.No.	Part No.	Description			Remark
		< COIL >			
L903	1-424-522-21	COIL, CHOKE 10uH			
L904	1-424-522-21	COIL, CHOKE 10uH			
L905	1-424-522-21	COIL, CHOKE 10uH			
L906	1-424-523-21	COIL, CHOKE 22uH			
L909	1-412-028-11	INDUCTOR CHIP 4.7uH			
L910	1-412-028-11	INDUCTOR CHIP 4.7uH			
L911	1-412-028-11	INDUCTOR CHIP 4.7uH			
L912	1-424-524-21	COIL, CHOKE 47uH			
L913	1-424-524-21	COIL, CHOKE 47uH			
L914	1-412-034-11	INDUCTOR CHIP 330uH			
L915	1-412-034-11	INDUCTOR CHIP 330uH			
L916	1-412-028-11	INDUCTOR CHIP 4.7uH			
		< TRANSISTOR >			
Q901	8-729-403-27	TRANSISTOR XN4401			
Q902	8-729-402-42	TRANSISTOR UN5213			
Q903	8-729-823-84	TRANSISTOR FP102			
Q904	8-729-804-41	TRANSISTOR 2SB1122-S			
Q905	8-729-823-82	TRANSISTOR FP101			
Q906	8-729-823-82	TRANSISTOR FP101			
Q907	8-729-402-81	TRANSISTOR XN4501			
Q908	8-729-805-25	TRANSISTOR 2SB1121			
Q909	8-729-805-25	TRANSISTOR 2SB1121			
Q910	8-729-403-35	TRANSISTOR UN5113			
		< RESISTOR >			
R901	1-216-837-11	METAL CHIP	22K	5%	1/16W
R902	1-218-871-11	METAL CHIP	10K	0.50%	1/16W
R903	1-216-837-11	METAL CHIP	22K	5%	1/16W
R904	1-218-853-11	METAL CHIP	1.8K	0.50%	1/16W
R905	1-218-879-11	METAL CHIP	22K	0.50%	1/16W
R906	1-218-863-11	METAL CHIP	4.7K	0.50%	1/16W
R907	1-216-818-11	METAL CHIP	560	5%	1/16W
R908	1-216-847-11	METAL CHIP	150K	5%	1/16W
R909	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R910	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R911	1-216-838-11	METAL CHIP	27K	5%	1/16W
R912	1-216-840-11	METAL CHIP	39K	5%	1/16W
R914	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R915	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R916	1-216-833-11	METAL CHIP	10K	5%	1/16W
R917	1-218-871-11	METAL CHIP	10K	0.50%	1/16W
R918	1-216-811-11	METAL CHIP	150	5%	1/16W
R919	1-218-871-11	METAL CHIP	10K	0.50%	1/16W
R920	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R921	1-216-841-11	METAL CHIP	47K	5%	1/16W
R922	1-216-833-11	METAL CHIP	10K	5%	1/16W
R923	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R924	1-216-823-11	METAL CHIP	1.5K	5%	1/16W

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piéce portant le numéro spécifié.

Ref. No.	Part No.	Description				Remark
R925	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R926	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R927	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R928	1-216-843-11	METAL CHIP	68K	5%	1/16W	
R929	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R930	1-216-182-00	METAL GLAZE	220	5%	1/8W	
R931	1-216-182-00	METAL GLAZE	220	5%	1/8W	
R932	1-216-182-00	METAL GLAZE	220	5%	1/8W	
R933	1-216-194-00	METAL CHIP	680	5%	1/8W	
R935	1-216-864-11	METAL CHIP	0	5%	1/16W	
R936	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R937	1-216-864-11	METAL CHIP	0	5%	1/16W	
R938	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R939	1-218-883-11	METAL CHIP	33K	0.50%	1/16W	
R940	1-218-877-11	METAL CHIP	18K	0.50%	1/16W	
R941	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R942	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R943	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R944	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R945	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R946	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R949	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R950	1-216-864-11	METAL CHIP	0	5%	1/16W	
R951	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R952	1-216-864-11	METAL CHIP	0	5%	1/16W	
R953	1-216-864-11	METAL CHIP	0	5%	1/16W	
		< SWITCH >				
S901	1-572-467-21	SWITCH, PUSH (1 KEY) (EJECT)				
		< TRANSFORMER >				
T901	1-450-874-21	TRANSFORMER, DC-DC CONVERTER				
**********						
*	A-7072-013-A	ED-37 BOARD, COMPLETE (TR350/TR350PK)				
		**********				
*	A-7072-015-A	ED-37 BOARD, COMPLETE (TR28/TR30)				
		**********				
		(Ref. No. 8,000 Series)				
		< DIODE >				
D987	8-719-404-40	DIODE MA121 (TR28/TR30)				
		< RESISTOR >				
R987	1-216-295-00	METAL CHIP	0	5%	1/10W	(TR28/TR30)

Ref. No.	Part No.	Description	Remark
		< SWITCH >	
S990	1-571-275-31	SWITCH, SLIDE (REMOTE COMMANDER)	(TR28/TR30)
		< FLEXIBLE BOARD >	
W987	1-696-622-11	FP-591 FLEXIBLE BOARD	
**********			
*	A-7066-021-A	JK-99 BOARD, COMPLETE	
		**********	
		(Ref. No. 3,000 Series)	
	3-884-171-00	STOPPER	
		< JACK >	
J517	1-537-649-11	TERMINAL BOARD (VIDEO/AUDIO OUT)	
		< FLAT CABLE >	
W517	1-751-814-11	CABLE, FLAT (FFC-124)	
**********			
*	A-7071-829-A	LI-46 BOARD, COMPLETE	
		**********	
		(Ref. No. 4,000 Series)	
		< CONNECTOR >	
* CN516	1-580-055-21	PIN, CONNECTOR 2P	
		< BATTERY HOLDER >	
H516	1-550-104-32	HOLDER, BATTERY (LITHIUM)	
**********			
		LS-33 BOARD (Ref. No. 9,000 Series)	
		**********	
		< DIODE >	
D001	8-719-989-52	DIODE GL4600S	
		< HALL ELEMENT >	
H001	8-719-987-62	DIODE LT140SAZ	
H002	8-719-987-62	DIODE LT140SAZ	
		< TRANSISTOR >	
Q001	8-729-012-46	TRANSISTOR PT4600FS	
Q002	8-729-012-46	TRANSISTOR PT4600FS	

LS-33 MA-206 MF-214 SL-41

Ref. No.	Part No.	Description			Remark
		< RESISTOR >			
R003	1-216-033-00	METAL CHIP	220	5%	1/10W
R004	1-216-033-00	METAL CHIP	220	5%	1/10W
R010	1-216-033-00	METAL CHIP	220	5%	1/10W
R011	1-216-033-00	METAL CHIP	220	5%	1/10W
		< SWITCH >			
S002	1-572-987-11	SWITCH, PUSH (3 KEY) (REC PROOF, ME/MP, MPHG)			
**********					
*	A-7063-970-A	MA-206 BOARD, COMPLETE ********** (Ref. No. 2,000 Series)			
		< CAPACITOR >			
C551	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C552	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C553	1-162-960-11	CERAMIC CHIP	220PF	10%	50V
C554	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C555	1-162-587-11	CERAMIC CHIP	0.039uF	10%	25V
C556	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C557	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C558	1-162-638-11	CERAMIC CHIP	1uF		16V
C562	1-162-638-11	CERAMIC CHIP	1uF		16V
C563	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C566	1-162-638-11	CERAMIC CHIP	1uF		16V
C569	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V
		< CONNECTOR >			
CN551	1-566-537-11	CONNECTOR, FPC (NON ZIF) 5P			
* CN552	1-580-056-21	PIN, CONNECTOR 3P			
		< DIODE >			
D552	8-719-404-46	DIODE MA110			
		< IC >			
IC551	8-759-822-37	IC LA7293M			
		< JACK >			
J551	1-568-027-11	JACK, SMALL TYPE 1P (MIC)			
		< COIL >			
L571	1-410-192-51	INDUCTOR CHIP 1uH			
L572	1-410-192-51	INDUCTOR CHIP 1uH			
		< TRANSISTOR >			
Q551	8-729-230-60	TRANSISTOR 2SA1586			

Ref. No.	Part No.	Description			Remark
		< RESISTOR >			
R551	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R552	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R553	1-216-838-11	METAL CHIP	27K	5%	1/16W
R554	1-216-838-11	METAL CHIP	27K	5%	1/16W
R555	1-216-864-11	METAL CHIP	0	5%	1/16W
R556	1-216-864-11	METAL CHIP	0	5%	1/16W
R558	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R564	1-216-295-00	METAL CHIP	0	5%	1/10W
R565	1-216-821-11	METAL CHIP	1K	5%	1/16W
R566	1-216-864-11	METAL CHIP	0	5%	1/16W
**********					
*	A-7072-009-A	MF-214 BOARD, COMPLETE ********** (Ref. No. 5,000 Series)			
		< DIODE >			
D971	8-719-404-46	DIODE MA110			
		< SWITCH >			
S973	1-572-467-21	SWITCH, PUSH (1 KEY) (LENS OPEN/CLOSE)			
		< FLAT CABLE >			
W971	1-696-484-11	CABLE, FLAT (FFC-87)			
**********					
*	A-7063-967-A	SL-41 BOARD, COMPLETE ********** (Ref. No. 5,000 Series)			
		< CAPACITOR >			
C521	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C522	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C523	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C524	1-128-013-11	ELECT CHIP	1uF	20%	50V
C525	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C526	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C527	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
		< CONNECTOR >			
CN521	1-691-482-21	CONNECTOR, FFC/FPC 15P			
CN522	1-691-472-21	CONNECTOR, FFC/FPC 6P			
CN523	1-691-473-21	CONNECTOR, FFC/FPC 7P			
		< IC >			
IC521	8-759-059-09	IC LB8111V			

Ref.No.	Part No.	Description			Remark
		< TRANSISTOR >			
Q521	8-729-402-81	TRANSISTOR XN4501			
		< RESISTOR >			
R522	1-216-845-11	METAL CHIP	100K	5%	1/16W
R523	1-216-845-11	METAL CHIP	100K	5%	1/16W
R524	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R525	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R528	1-216-845-11	METAL CHIP	100K	5%	1/16W
R530	1-216-840-11	METAL CHIP	39K	5%	1/16W
R532	1-216-174-00	METAL GLAZE	100	5%	1/8W
R533	1-216-864-11	METAL CHIP	0	5%	1/16W
		< NETWORK >			
RB521	1-236-424-11	NETWORK, RES 10K			
RB522	1-236-424-11	NETWORK, RES 10K			
		< FLEXIBLE BOARD >			
W521	1-642-186-11	FP-437 FLEXIBLE BOARD			
W522	1-696-490-11	FP-589 FLEXIBLE BOARD			
**********					
*	A-7071-828-A	SW-223 BOARD, COMPLETE			
		**********			
		(Ref. No. 7,000 Series)			
		< SWITCH >			
S519	1-553-977-00	SWITCH, SLIDE (STANDBY)			
S520	1-571-315-11	SWITCH, KEY BOARD (START/STOP)			
		< FLAT CABLE >			
W519	1-696-488-11	CABLE, FLAT (FFC-92)			
**********					
*	A-7063-965-A	VC-147 BOARD, COMPLETE			
		**********			
		(Ref. No. 3,000 Series)			
		< CAPACITOR >			
C701	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C702	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C703	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C705	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C707	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C708	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C711	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C712	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C713	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C716	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C718	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C719	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C721	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C722	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C723	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C724	1-164-634-11	CERAMIC CHIP	1uF		16V
C725	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C726	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C727	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C728	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C729	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C730	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C734	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C735	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C737	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C738	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C739	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C741	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C742	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C749	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C750	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C751	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C752	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C801	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C802	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C803	1-163-077-91	CERAMIC CHIP	0.1uF		50V
C804	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C805	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C806	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C807	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C808	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C809	1-163-077-91	CERAMIC CHIP	0.1uF		50V
C810	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C811	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C813	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C814	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C815	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C817	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C818	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C819	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C820	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C821	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C823	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C824	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C826	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C827	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C830	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C832	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C833	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C834	1-164-360-11	CERAMIC CHIP	0.1uF		16V

Ref. No.	Part No.	Description			Remark
C835	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C836	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C837	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C838	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C839	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C841	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C851	1-164-633-11	CERAMIC CHIP	0.1uF	10%	25V
C852	1-162-971-11	CERAMIC CHIP	0.001uF		50V
C853	1-164-634-11	CERAMIC CHIP	1uF		16V
C854	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C855	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C856	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C857	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C858	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C859	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C860	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C861	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C862	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C863	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C864	1-162-638-11	CERAMIC CHIP	1uF		16V
C866	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C868	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C869	1-164-173-11	CERAMIC CHIP	0.0039uF	10%	50V
C870	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C871	1-164-634-11	CERAMIC CHIP	1uF		16V

< CONNECTOR >

CN701	1-573-372-21	CONNECTOR, BOARD TO BOARD 18P
CN801	1-573-336-11	CONNECTOR, BOARD TO BOARD 16P
CN851	1-573-361-11	CONNECTOR, FFC/FPC 21P

< TRIMMER >

CT801	1-141-356-11	CAP, ADJ 6PF

< FILTER >

FL701	1-236-834-21	FILTER, LOW PASS
FL702	1-415-751-21	DELAY LINE, LC (YH)

< IC >

IC702	8-759-064-36	IC	MB88346BPFV
IC703	8-759-710-07	IC	NJM2234M
IC704	8-752-358-10	IC	CXD2101BR
IC705	8-759-069-18	IC	CXD2103AR
IC706	8-752-355-56	IC	CXD2104BN
IC707	8-752-347-93	IC	CXD2100AQ
IC709	8-752-840-64	IC	CXP80624-434R
IC712	8-759-159-70	IC	BR9021BF
IC801	8-752-350-16	IC	CXD1257AR
IC802	8-752-060-50	IC	CXA1577R
IC803	8-752-053-26	IC	CXA1399Q
IC804	8-752-327-48	IC	CXD1250N
IC805	8-752-054-61	IC	CXA1390AR
IC851	8-759-701-24	IC	NJM3414M
IC852	8-759-060-00	IC	LM324DR
IC853	8-759-058-47	IC	MPC1724VM
IC854	8-759-823-51	IC	LB1830M
IC856	8-759-998-98	IC	LM358D

< COIL >

L701	1-412-006-31	INDUCTOR CHIP 10uH
L704	1-412-006-31	INDUCTOR CHIP 10uH
L706	1-412-062-11	INDUCTOR CHIP 47uH
L708	1-412-979-21	INDUCTOR 1uH
L711	1-412-058-11	INDUCTOR CHIP 10uH
L714	1-412-006-31	INDUCTOR CHIP 10uH
L715	1-412-058-11	INDUCTOR CHIP 10uH
L717	1-412-058-11	INDUCTOR CHIP 10uH
L720	1-412-006-31	INDUCTOR CHIP 10uH
L721	1-410-391-11	INDUCTOR CHIP 68uH
L801	1-412-029-11	INDUCTOR CHIP 10uH
L802	1-412-006-31	INDUCTOR CHIP 10uH
L803	1-412-058-11	INDUCTOR CHIP 10uH
L804	1-412-058-11	INDUCTOR CHIP 10uH
L851	1-412-058-11	INDUCTOR CHIP 10uH
L853	1-412-031-11	INDUCTOR CHIP 47uH

< TRANSISTOR >

Q701	8-729-928-87	TRANSISTOR	DTC124EE
Q702	8-729-427-74	TRANSISTOR	XP4601
Q703	8-729-427-74	TRANSISTOR	XP4601
Q704	8-729-425-50	TRANSISTOR	2SB1462Q
Q706	8-729-425-64	TRANSISTOR	2SD2216Q
Q707	8-729-428-84	TRANSISTOR	UN9111
Q708	8-729-425-64	TRANSISTOR	2SD2216Q
Q709	8-729-427-72	TRANSISTOR	XP4501
Q801	8-729-425-64	TRANSISTOR	2SD2216Q
Q802	8-729-427-70	TRANSISTOR	XP4401
Q851	8-729-425-64	TRANSISTOR	2SD2216Q
Q852	8-729-907-00	TRANSISTOR	DTC114EU
Q853	8-729-427-70	TRANSISTOR	XP4401

< RESISTOR >

R701	1-216-864-11	METAL CHIP	0	5%	1/16W
R702	1-216-821-11	METAL CHIP	1K	5%	1/16W
R703	1-216-837-11	METAL CHIP	22K	5%	1/16W
R704	1-216-815-11	METAL CHIP	330	5%	1/16W
R705	1-216-833-11	METAL CHIP	10K	5%	1/16W
R707	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R708	1-216-845-11	METAL CHIP	100K	5%	1/16W
R709	1-216-839-11	METAL CHIP	33K	5%	1/16W

Ref. No.	Part No.	Description				Remark
R711	1-216-864-11	METAL CHIP	0	5%	1/16W	
R712	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R713	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R714	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R715	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R716	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R718	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R720	1-216-864-11	METAL CHIP	0	5%	1/16W	
R721	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R722	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R724	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R725	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R727	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R728	1-216-864-11	METAL CHIP	0	5%	1/16W	
R729	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R731	1-216-295-00	METAL CHIP	0	5%	1/10W	
R732	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R733	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R734	1-216-817-11	METAL CHIP	470	5%	1/16W	
R735	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R736	1-216-864-11	METAL CHIP	0	5%	1/16W	
R738	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R739	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R742	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R744	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R745	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R747	1-216-864-11	METAL CHIP	0	5%	1/16W	
R749	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R750	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R751	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R752	1-216-817-11	METAL CHIP	470	5%	1/16W	
R753	1-216-834-11	METAL CHIP	12K	5%	1/16W	
R754	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R755	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R756	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R757	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R758	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R759	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R760	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R761	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R762	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R769	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R770	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R771	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R772	1-216-864-11	METAL CHIP	0	5%	1/16W	
R773	1-216-864-11	METAL CHIP	0	5%	1/16W	
R775	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R776	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R777	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R778	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R779	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R781	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R782	1-216-813-11	METAL CHIP	220	5%	1/16W	
R784	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R785	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R787	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R791	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R792	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R793	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R794	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R795	1-216-815-11	METAL CHIP	330	5%	1/16W	
R796	1-216-817-11	METAL CHIP	470	5%	1/16W	
R797	1-216-818-11	METAL CHIP	560	5%	1/16W	
R802	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R803	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R804	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R805	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R806	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R807	1-216-819-11	METAL CHIP	680	5%	1/16W	
R808	1-216-801-11	METAL CHIP	22	5%	1/16W	
R809	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R810	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R812	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R813	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R816	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R819	1-216-805-11	METAL CHIP	47	5%	1/16W	
R821	1-216-863-11	METAL GLAZE	3.3M	5%	1/16W	
R823	1-218-876-11	METAL CHIP	16K	0.50%	1/16W	
R825	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R826	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R827	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R828	1-218-871-11	METAL CHIP	10K	0.50%	1/16W	
R829	1-218-899-11	METAL CHIP	150K	0.50%	1/16W	
R830	1-218-847-11	METAL CHIP	1K	0.50%	1/16W	
R831	1-216-864-11	METAL CHIP	0	5%	1/16W	
R833	1-216-295-00	METAL CHIP	0	5%	1/10W	
R851	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R852	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R853	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R854	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R855	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R856	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R857	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R858	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R859	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R860	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R861	1-218-879-11	METAL CHIP	22K	0.50%	1/16W	
R862	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R863	1-216-855-11	METAL CHIP	680K	5%	1/16W	
R864	1-216-134-00	METAL CHIP	2.2	5%	1/8W	

Ref.No.	Part No.	Description			Remark
R865	1-216-829-11	METAL CHIP	4.7K	5% 1/16W	
R866	1-216-820-11	METAL CHIP	820	5% 1/16W	
R867	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R868	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R869	1-218-881-11	METAL CHIP	27K	0.50% 1/16W	
R870	1-216-841-11	METAL CHIP	47K	5% 1/16W	
R871	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R872	1-216-851-11	METAL CHIP	330K	5% 1/16W	
R873	1-216-814-11	METAL CHIP	270	5% 1/16W	
R874	1-216-842-11	METAL CHIP	56K	5% 1/16W	
R875	1-216-296-91	METAL GLAZE	0	5% 1/8W	
R876	1-216-864-11	METAL CHIP	0	5% 1/16W	
R890	1-216-296-91	METAL GLAZE	0	5% 1/8W	
R891	1-216-296-91	METAL GLAZE	0	5% 1/8W	
		< NETWORK >			
RB701	1-236-420-11	NETWORK, RES 4.7K			
RB702	1-236-432-11	NETWORK, RES 47K			
RB703	1-236-412-11	NETWORK, RES 1.0K			
RB704	1-236-416-11	NETWORK, RES 2.2K			
RB705	1-236-416-11	NETWORK, RES 2.2K			
RB706	1-236-412-11	NETWORK, RES 1.0K			
RB707	1-236-412-11	NETWORK, RES 1.0K			
RB708	1-236-412-11	NETWORK, RES 1.0K			
		< VIBRATOR >			
X701	1-579-553-11	VIBRATOR (12MHz)			
X801	1-579-619-11	VIBRATOR, CRYSTAL (28.6363MHz)			
**********					
*	A-7063-183-A	VF-42 BOARD, COMPLETE			
		**********			
		(Ref. No. 1,000 Series)			
	3-942-888-01	HOLDER, LED			
		< CAPACITOR >			
C501	1-126-176-11	ELECT	220uF	20% 10V	
C502	1-163-077-91	CERAMIC CHIP	0.1uF	50V	
C503	1-163-109-00	CERAMIC CHIP	47PF	5% 50V	
⚠C504	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
⚠C505	1-164-713-11	CERAMIC CHIP	0.0056uF	5% 50V	
⚠C506	1-164-713-11	CERAMIC CHIP	0.0056uF	5% 50V	
C507	1-127-515-11	ELECT(SOLID)	47uF	20% 6.3V	
C508	1-164-611-11	CERAMIC CHIP	0.001uF	10% 500V	
C509	1-124-257-00	ELECT	2.2uF	20% 50V	
C510	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	
C511	1-126-090-11	ELECT	82uF	20% 10V	
C512	1-137-306-11	FILM CHIP	0.1uF	5% 16V	
C513	1-135-149-21	TANTALUM CHIP	2.2uF	20% 10V	

Ref.No.	Part No.	Description			Remark
C514	1-131-381-00	TANTALUM	47uF	10% 10V	
C515	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	
C516	1-135-149-21	TANTALUM CHIP	2.2uF	20% 10V	
		< CONNECTOR >			
* CN501	1-566-759-11	PIN, CONNECTOR (PC BOARD) 4P			
* CN502	1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P			
* CN503	1-566-195-11	PIN, CONNECTOR (PC BOARD) 2P			
		< DIODE >			
D501	8-719-820-65	LED TLS221 (TALLY)			
D502	8-719-984-02	LED BR4371F (TALLY)			
D503	8-719-400-20	DIODE MA152WA			
		< IC >			
IC501	8-759-420-01	IC AN2512S			
		< COIL >			
L501	1-408-976-21	INDUCTOR 33uH			
L502	1-408-785-21	INDUCTOR CHIP 47uH			
⚠L503	1-459-876-41	COIL, FERRITE (HLC)			
		< TRANSISTOR >			
Q501	8-729-120-28	TRANSISTOR 2SC1623			
Q502	8-729-216-31	TRANSISTOR 2SA1163-G			
⚠Q503	8-729-120-28	TRANSISTOR 2SC1623			
Q504	8-729-106-68	TRANSISTOR 2SD1615A-GP			
		< RESISTOR >			
R501	1-216-033-00	METAL CHIP	220	5% 1/10W	
R502	1-216-041-00	METAL CHIP	470	5% 1/10W	
R503	1-216-041-00	METAL CHIP	470	5% 1/10W	
⚠R504	1-216-675-11	METAL CHIP	10K	0.5% 1/10W	
⚠R505	1-218-150-11	METAL GLAZE	1.2K	1% 1/10W	
R506	1-216-069-00	METAL CHIP	6.8K	5% 1/10W	
R507	1-216-047-00	METAL CHIP	820	5% 1/10W	
R508	1-216-689-11	METAL CHIP	39K	0.5% 1/10W	
R509	1-216-689-11	METAL CHIP	39K	0.5% 1/10W	
R510	1-216-005-00	METAL CHIP	15	5% 1/10W	
R511	1-216-121-00	METAL CHIP	1M	5% 1/10W	
R512	1-216-131-11	METAL CHIP	2.7M	5% 1/10W	
R513	1-216-101-00	METAL CHIP	150K	5% 1/10W	
R514	1-216-121-00	METAL CHIP	1M	5% 1/10W	
R515	1-216-131-11	METAL CHIP	2.7M	5% 1/10W	
R516	1-216-055-00	METAL CHIP	1.8K	5% 1/10W	
R517	1-216-025-00	METAL CHIP	100	5% 1/10W	
R518	1-216-308-00	METAL CHIP	4.7	5% 1/10W	
R519	1-216-336-11	METAL CHIP	47K	1% 1/10W	
R520	1-216-099-00	METAL CHIP	120K	5% 1/10W	

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Ref. No.	Part No.	Description				Remark
R521	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R522	1-216-160-00	METAL GLAZE	27	5%	1/8W	
R523	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R524	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R525	1-216-097-00	METAL CHIP	100K	5%	1/10W	
		< VARIABLE RESISTOR >				
RV501	1-241-596-11	RES, ADJ, METAL GRAZE	47K			
RV502	1-241-590-11	RES, ADJ, METAL GRAZE	470			
RV503	1-241-592-11	RES, ADJ, METAL GRAZE	2.2K			
RV504	1-228-762-00	RES, ADJ, METAL GLAZE	1M			
		< TRANSFORMER >				
⚠T501	1-439-486-11	TRANSFORMER ASSY, FLYBACK				
		< THERMISTOR >				
TH501	1-809-350-21	THERMISTOR, NTC (2125)				
		< SOCKET >				
⚠W501	1-540-019-21	SOCKET ASSY, CRT				
**********						
*	A-7072-010-A	VK-32 BOARD, COMPLETE				
		**********				
		(Ref. No. 9,000 Series)				
		< DIODE >				
D977	8-719-420-14	DIODE MA8082				
D978	8-719-420-14	DIODE MA8082				
D979	8-719-420-14	DIODE MA8082				
D980	8-719-420-14	DIODE MA8082				
D981	8-719-420-14	DIODE MA8082				
		< SWITCH >				
S976	1-572-921-31	SWITCH, KEY BOARD (■ STOP)				
S979	1-572-921-31	SWITCH, KEY BOARD (◀◀ REW)				
S980	1-572-921-31	SWITCH, KEY BOARD (▷ PLAY)				
S983	1-572-921-31	SWITCH, KEY BOARD (▶▶ FF)				
S984	1-572-921-31	SWITCH, KEY BOARD (❚❚ PAUSE)				
**********						
*	A-7066-014-A	VS-116 BOARD, COMPLETE (TR28/TR30)				
		**********				
*	A-7066-020-A	VS-116 BOARD, COMPLETE (TR350/TR350PK)				
		**********				
		(Ref. No. 4,000 Series)				
	1-691-471-11	CONNECTOR, TRANSLATION 11P				

Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C001	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C002	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C003	1-162-955-11	CERAMIC CHIP	150PF	5%	50V
C004	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C005	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C006	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C009	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C010	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C011	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C012	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C013	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C014	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C018	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C019	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C020	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C021	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C022	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C023	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C024	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C025	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C026	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C027	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C028	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C029	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C030	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C035	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C049	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C057	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C058	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C059	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C061	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C063	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C064	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C065	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C066	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C067	1-165-128-11	CERAMIC CHIP	0.22uF		16V
C068	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C069	1-162-948-11	CERAMIC CHIP	39PF	5%	50V
C072	1-162-943-11	CERAMIC CHIP	15PF	5%	50V
C073	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C074	1-162-956-11	CERAMIC CHIP	180PF	5%	50V
C075	1-162-942-11	CERAMIC CHIP	12PF	5%	50V
C076	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C077	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C080	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C081	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C082	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C083	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C085	1-162-947-11	CERAMIC CHIP	33PF	5%	50V

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Ref.No.	Part No.	Description			Remark
C091	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C092	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C150	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C151	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C156	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C159	1-162-950-11	CERAMIC CHIP	56PF	5%	50V
C161	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C167	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C170	1-162-568-11	CERAMIC CHIP	0.33uF		25V
C171	1-162-638-11	CERAMIC CHIP	1uF		16V
C173	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C175	1-128-004-11	ELECT CHIP	10uF	20%	16V
C176	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C177	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C178	1-164-145-11	CERAMIC CHIP	390PF	5%	50V
C179	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C180	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C181	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C182	1-162-958-11	CERAMIC CHIP	270PF	5%	50V
C187	1-162-948-11	CERAMIC CHIP	39PF	5%	50V
C192	1-164-217-11	CERAMIC CHIP	150PF	5%	50V
C194	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C199	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C205	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C206	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C207	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C208	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C209	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C213	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C214	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C216	1-128-004-11	ELECT CHIP	10uF	20%	16V
C217	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V
C218	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C219	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C220	1-126-246-11	ELECT CHIP	220uF	20%	4V
C221	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C222	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C223	1-128-004-11	ELECT CHIP	10uF	20%	16V
C225	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C226	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C227	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C228	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C229	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C230	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C231	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C232	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C233	1-128-006-11	ELECT CHIP	4.7uF	20%	25V
C234	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C235	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C236	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C237	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C238	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C239	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C240	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C241	1-126-607-11	ELECT CHIP	47uF	20%	4V
C242	1-162-960-11	CERAMIC CHIP	220PF	10%	50V
C246	1-135-157-21	TANTALUM CHIP	10uF	20%	6.3V
C247	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C248	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C249	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C250	1-164-145-11	CERAMIC CHIP	390PF	5%	50V
C254	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C255	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C256	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C257	1-162-947-11	CERAMIC CHIP	33PF	5%	50V
C259	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C260	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C261	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C262	1-162-954-11	CERAMIC CHIP	120PF	5%	50V
C263	1-162-951-11	CERAMIC CHIP	68PF	5%	50V
C264	1-162-950-11	CERAMIC CHIP	56PF	5%	50V
C265	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C266	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C267	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C268	1-162-955-11	CERAMIC CHIP	150PF	5%	50V
C271	1-128-004-11	ELECT CHIP	10uF	20%	16V
C272	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C273	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C274	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C275	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C276	1-162-945-11	CERAMIC CHIP	22PF	5%	50V
C277	1-162-941-11	CERAMIC CHIP	10PF	0.5PF	50V
C278	1-162-638-11	CERAMIC CHIP	1uF		16V
C280	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C281	1-135-146-21	TANTALUM CHIP	0.68uF	20%	25V
C282	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C283	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C284	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C285	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C286	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C288	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C289	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C290	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C291	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C292	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C294	1-162-638-11	CERAMIC CHIP	1uF		16V
C296	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C297	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C299	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C300	1-162-949-11	CERAMIC CHIP	47PF	5%	50V

Ref.No.	Part No.	Description			Remark
C301	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C303	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V
C304	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C305	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C306	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C307	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C308	1-162-949-11	CERAMIC CHIP	47PF	5%	50V
C401	1-164-346-11	CERAMIC CHIP	1uF		16V
C403	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C404	1-164-346-11	CERAMIC CHIP	1uF		16V
C405	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C406	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C408	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C409	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C412	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C413	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C414	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C415	1-165-128-11	CERAMIC CHIP	0.22uF		16V
C416	1-162-916-11	CERAMIC CHIP	12PF	5%	50V
C417	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C418	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C421	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C422	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C423	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C424	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C426	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C427	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C428	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C429	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C430	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C431	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C432	1-164-173-11	CERAMIC CHIP	0.0039uF	10%	50V
C433	1-162-918-11	CERAMIC CHIP	18PF	5%	50V
C434	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C435	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C436	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C437	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C438	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C439	1-162-907-11	CERAMIC CHIP	2PF	0.25PF	50V
C440	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C441	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C442	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C445	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C446	1-162-995-11	CERAMIC CHIP	0.022uF		50V
C447	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C449	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C450	1-164-360-11	CERAMIC CHIP	0.1uF		16V (TR28/TR30)
C452	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C453	1-162-927-11	CERAMIC CHIP	100PF	5%	50V (TR28/TR30)
C454	1-162-927-11	CERAMIC CHIP	100PF	5%	50V (TR28/TR30)
C455	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C456	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C457	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C458	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C459	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C460	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C461	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C462	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C463	1-135-215-21	TANTAL. CHIP	6.8uF	20%	16V
C464	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V
C465	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C466	1-164-298-11	CERAMIC CHIP	0.15uF	10%	25V
C467	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C468	1-164-298-11	CERAMIC CHIP	0.15uF	10%	25V
C469	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C470	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C471	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C472	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C473	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C474	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V
C476	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C477	1-162-974-11	CERAMIC CHIP	0.01uF		50V
C478	1-162-963-11	CERAMIC CHIP	680PF	10%	50V
C481	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C482	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C483	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C485	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C487	1-128-530-11	ELECT CHIP	33uF	20%	10V
C488	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C489	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
		< FILTER >			
CF151	1-579-370-11	FILTER, CERAMIC			
		< CONNECTOR >			
CN002	1-569-775-21	PIN, CONNECTOR 5P			
CN101	1-566-538-11	CONNECTOR, FPC (NON ZIF) 6P			
CN102	1-580-789-21	PIN, CONNECTOR (SMD) 6P			
CN401	1-573-310-11	CONNECTOR, BOARD TO BOARD 20P			
CN403	1-573-338-11	CONNECTOR, BOARD TO BOARD 20P			
CN404	1-695-325-11	CONNECTOR, BOARD TO BOARD 42P			
CN406	1-573-343-21	CONNECTOR, BOARD TO BOARD 30P			
* CN407	1-580-055-21	PIN, CONNECTOR 2P			
		< DIODE >			
D001	8-719-800-76	DIODE 1SS123			

Ref. No.	Part No.	Description	Remark
D152	8-719-027-48	DIODE MA142WA	
D159	8-719-027-50	DIODE MA142WK	
D160	8-719-027-50	DIODE MA142WK	
D163	8-719-027-50	DIODE MA142WK	
⚠D401	8-719-421-27	DIODE MA728	
D402	8-719-027-50	DIODE MA142WK	
D403	8-719-404-46	DIODE MA110	
D456	8-719-420-14	DIODE MA8082	
D462	8-719-420-14	DIODE MA8082	
		< FILTER >	
FL152	1-236-575-11	B.P.F	
FL153	1-236-146-11	FILTER, BAND PASS	
FL155	1-236-757-21	FILTER, LOW PASS (C)	
FL401	1-406-452-11	COIL, OSC	
		< IC >	
IC001	8-752-033-38	IC CXA1202R	
IC003	8-752-053-21	IC CXA1211M	
IC151	8-752-065-54	IC CXA1207AR	
IC152	8-752-051-40	IC CXA1208R	
IC154	8-752-332-68	IC CXL5502M	
IC155	8-752-053-21	IC CXA1211M	
IC156	8-759-055-82	IC M62353GP	
IC158	8-759-055-82	IC M62353GP	
IC159	8-759-636-33	IC CXA1452N	
⚠IC401	8-759-056-84	IC S-8420AF	
IC402	8-752-836-29	IC CXP80624-416R	
IC403	8-759-258-83	IC uPD75316GF-463-3B9	
IC404	8-759-059-42	IC CXA1481AR	
IC405	8-759-044-78	IC BR9011BF-RE2	
IC406	8-759-081-96	IC uPD6456GS-620	
IC407	8-759-145-63	IC uPD7564G-540 (TR28/TR30)	
IC408	8-759-057-60	IC MCD004BM	
IC409	8-759-999-02	IC TL1596CDB	
IC410	8-759-062-02	IC MPC1720VM	
		< COIL >	
L001	1-410-381-11	INDUCTOR CHIP 10uH	
L002	1-412-066-21	INDUCTOR CHIP 220uH	
L003	1-412-066-21	INDUCTOR CHIP 220uH	
L005	1-412-060-11	INDUCTOR CHIP 22uH	
L007	1-412-058-11	INDUCTOR CHIP 10uH	
L009	1-410-380-31	INDUCTOR CHIP 8.2uH	
L010	1-410-655-31	INDUCTOR CHIP 120uH	
L011	1-412-280-31	INDUCTOR 330uH	
L012	1-410-387-11	INDUCTOR CHIP 33uH	
L013	1-410-657-21	INDUCTOR CHIP 180uH	
L015	1-410-381-11	INDUCTOR CHIP 10uH	
L150	1-410-389-31	INDUCTOR CHIP 47uH	
L152	1-410-385-11	INDUCTOR CHIP 22uH	
L154	1-410-390-11	INDUCTOR CHIP 56uH	
L155	1-410-390-11	INDUCTOR CHIP 56uH	
L160	1-412-058-11	INDUCTOR CHIP 10uH	
L161	1-410-385-11	INDUCTOR CHIP 22uH	
L162	1-412-280-31	INDUCTOR 330uH	
L163	1-410-167-41	INDUCTOR CHIP 820uH	
L164	1-410-657-21	INDUCTOR CHIP 180uH	
L169	1-410-389-31	INDUCTOR CHIP 47uH	
L171	1-410-390-11	INDUCTOR CHIP 56uH	
L175	1-410-393-11	INDUCTOR CHIP 100uH	
L176	1-410-656-11	INDUCTOR CHIP 150uH	
L177	1-412-058-11	INDUCTOR CHIP 10uH	
L178	1-412-062-11	INDUCTOR CHIP 47uH	
L179	1-410-379-31	INDUCTOR CHIP 6.8uH	
L180	1-410-393-11	INDUCTOR CHIP 100uH	
L181	1-410-393-11	INDUCTOR CHIP 100uH	
L182	1-410-655-31	INDUCTOR CHIP 120uH	
L183	1-410-385-11	INDUCTOR CHIP 22uH	
L184	1-410-385-11	INDUCTOR CHIP 22uH	
L185	1-412-058-11	INDUCTOR CHIP 10uH	
L186	1-412-052-21	INDUCTOR CHIP 1uH	
L401	1-412-056-11	INDUCTOR CHIP 4.7uH	
L402	1-412-058-11	INDUCTOR CHIP 10uH	
L403	1-412-062-11	INDUCTOR CHIP 47uH	
L404	1-412-058-11	INDUCTOR CHIP 10uH	
L405	1-412-058-11	INDUCTOR CHIP 10uH	
L406	1-412-058-11	INDUCTOR CHIP 10uH	
L407	1-414-261-11	INDUCTOR 1uH	
		< IC LINK >	
⚠PS401	1-576-122-21	LINK, IC (0.4A CCP2E10)	
⚠PS402	1-576-123-21	LINK, IC (0.8A CCP2E20)	
		< TRANSISTOR >	
Q001	8-729-216-22	TRANSISTOR 2SA1162	
Q002	8-729-014-16	TRANSISTOR RN2302	
Q003	8-729-230-60	TRANSISTOR 2SA1586	
Q008	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q010	8-729-403-35	TRANSISTOR UN5113	
Q019	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q020	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q021	8-729-230-60	TRANSISTOR 2SA1586	
Q024	8-729-102-07	TRANSISTOR 2SC2223-F13	
Q025	8-729-014-16	TRANSISTOR RN2302	
Q026	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q029	8-729-403-35	TRANSISTOR UN5113	
Q151	8-729-101-07	TRANSISTOR 2SB798-DL	
Q152	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q154	8-729-402-32	TRANSISTOR 2SD1819A-R	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piéce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
Q158	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q161	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q162	8-729-403-35	TRANSISTOR UN5113	
Q166	8-729-230-60	TRANSISTOR 2SA1586	
Q168	8-729-403-35	TRANSISTOR UN5113	
Q170	8-729-420-20	TRANSISTOR XN4312	
Q171	8-729-117-73	TRANSISTOR 2SC4178-F14	
Q172	8-729-117-73	TRANSISTOR 2SC4178-F14	
Q175	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q176	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q177	8-729-230-60	TRANSISTOR 2SA1586	
Q178	8-729-230-60	TRANSISTOR 2SA1586	
Q180	8-729-422-54	TRANSISTOR XN4215	
Q182	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q183	8-729-420-53	TRANSISTOR UN5115	
Q184	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q189	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q192	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q194	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q195	8-729-230-60	TRANSISTOR 2SA1586	
Q196	8-729-403-35	TRANSISTOR UN5113	
Q199	8-729-807-87	TRANSISTOR 2SB1295-UL6	
Q200	8-729-013-88	TRANSISTOR RN1302	
Q203	8-729-230-60	TRANSISTOR 2SA1586	
Q204	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q205	8-729-402-42	TRANSISTOR UN5213	
Q207	8-729-403-35	TRANSISTOR UN5113	
Q208	8-729-013-88	TRANSISTOR RN1302	
Q210	8-729-402-42	TRANSISTOR UN5213	
Q221	8-729-420-12	TRANSISTOR XN4213	
Q226	8-729-403-35	TRANSISTOR UN5113	
Q231	8-729-230-60	TRANSISTOR 2SA1586	
Q232	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q233	8-729-402-32	TRANSISTOR 2SD1819A-R	
Q234	8-729-230-60	TRANSISTOR 2SA1586	
Q236	8-729-420-56	TRANSISTOR UN511E	
Q237	8-729-230-60	TRANSISTOR 2SA1586	
Q401	8-729-402-48	TRANSISTOR UN521E	
Q403	8-729-403-35	TRANSISTOR UN5113 (TR28/TR30)	
Q405	8-729-013-88	TRANSISTOR RN1302	
Q409	8-729-017-67	TRANSISTOR 2SB1574	

< RESISTOR >

Ref. No.	Part No.	Description			Remark
R001	1-216-806-11	METAL GLAZE	56	5% 1/16W	
R002	1-216-818-11	METAL CHIP	560	5% 1/16W	
R003	1-216-803-11	METAL CHIP	33	5% 1/16W	
R004	1-216-814-11	METAL CHIP	270	5% 1/16W	
R005	1-216-813-11	METAL CHIP	220	5% 1/16W	
R006	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R007	1-216-839-11	METAL CHIP	33K	5% 1/16W	
R012	1-216-835-11	METAL CHIP	15K	5% 1/16W	
R013	1-216-841-11	METAL CHIP	47K	5% 1/16W	
R016	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R017	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R020	1-216-823-11	METAL CHIP	1.5K	5% 1/16W	
R021	1-216-836-11	METAL CHIP	18K	5% 1/16W	
R022	1-216-840-11	METAL CHIP	39K	5% 1/16W	
R023	1-216-838-11	METAL CHIP	27K	5% 1/16W	
R024	1-216-838-11	METAL CHIP	27K	5% 1/16W	
R025	1-216-823-11	METAL CHIP	1.5K	5% 1/16W	
R026	1-216-832-11	METAL CHIP	8.2K	5% 1/16W	
R027	1-216-841-11	METAL CHIP	47K	5% 1/16W	
R028	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R029	1-216-825-11	METAL CHIP	2.2K	5% 1/16W	
R030	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R031	1-216-829-11	METAL CHIP	4.7K	5% 1/16W	
R033	1-216-791-11	METAL CHIP	3.3	5% 1/16W	
R049	1-216-824-11	METAL CHIP	1.8K	5% 1/16W	
R050	1-216-832-11	METAL CHIP	8.2K	5% 1/16W	
R051	1-216-831-11	METAL CHIP	6.8K	5% 1/16W	
R052	1-216-823-11	METAL CHIP	1.5K	5% 1/16W	
R054	1-216-817-11	METAL CHIP	470	5% 1/16W	
R055	1-216-820-11	METAL CHIP	820	5% 1/16W	
R056	1-216-864-11	METAL CHIP	0	5% 1/16W	
R057	1-216-818-11	METAL CHIP	560	5% 1/16W	
R058	1-216-818-11	METAL CHIP	560	5% 1/16W	
R060	1-216-864-11	METAL CHIP	0	5% 1/16W	
R061	1-216-821-11	METAL CHIP	1K	5% 1/16W	
R062	1-216-818-11	METAL CHIP	560	5% 1/16W	
R063	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R064	1-216-817-11	METAL CHIP	470	5% 1/16W	
R066	1-216-809-11	METAL CHIP	100	5% 1/16W	
R067	1-216-836-11	METAL CHIP	18K	5% 1/16W	
R070	1-216-834-11	METAL CHIP	12K	5% 1/16W	
R071	1-216-823-11	METAL CHIP	1.5K	5% 1/16W	
R072	1-216-823-11	METAL CHIP	1.5K	5% 1/16W	
R076	1-216-824-11	METAL CHIP	1.8K	5% 1/16W	
R078	1-216-820-11	METAL CHIP	820	5% 1/16W	
R079	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R081	1-216-864-11	METAL CHIP	0	5% 1/16W	
R082	1-216-864-11	METAL CHIP	0	5% 1/16W	
R083	1-216-821-11	METAL CHIP	1K	5% 1/16W	
R085	1-216-821-11	METAL CHIP	1K	5% 1/16W	
R086	1-216-817-11	METAL CHIP	470	5% 1/16W	
R087	1-216-823-11	METAL CHIP	1.5K	5% 1/16W	
R088	1-216-808-11	METAL CHIP	82	5% 1/16W	
R090	1-216-836-11	METAL CHIP	18K	5% 1/16W	
R097	1-216-821-11	METAL CHIP	1K	5% 1/16W	
R112	1-216-831-11	METAL CHIP	6.8K	5% 1/16W	
R113	1-216-295-00	METAL CHIP	0	5% 1/10W	

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Ref.No.	Part No.	Description				Remark
R114	1-216-864-11	METAL CHIP	0	5%	1/16W	
R131	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R132	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R142	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R151	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R152	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R153	1-216-304-11	METAL CHIP	3.3	5%	1/10W	
R154	1-216-820-11	METAL CHIP	820	5%	1/16W	
R155	1-216-836-11	METAL CHIP	18K	5%	1/16W	
R156	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R158	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R160	1-216-819-11	METAL CHIP	680	5%	1/16W	
R161	1-216-809-11	METAL CHIP	100	5%	1/16W	
R164	1-216-809-11	METAL CHIP	100	5%	1/16W	
R167	1-216-820-11	METAL CHIP	820	5%	1/16W	
R168	1-216-820-11	METAL CHIP	820	5%	1/16W	
R170	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R175	1-216-813-11	METAL CHIP	220	5%	1/16W	
R177	1-216-818-11	METAL CHIP	560	5%	1/16W	
R178	1-216-817-11	METAL CHIP	470	5%	1/16W	
R179	1-216-820-11	METAL CHIP	820	5%	1/16W	
R189	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R190	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R192	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R193	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R194	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R196	1-216-815-11	METAL CHIP	330	5%	1/16W	
R198	1-216-817-11	METAL CHIP	470	5%	1/16W	
R200	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R201	1-216-815-11	METAL CHIP	330	5%	1/16W	
R202	1-216-840-11	METAL CHIP	39K	5%	1/16W	
R203	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R204	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R205	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R206	1-216-813-11	METAL CHIP	220	5%	1/16W	
R208	1-216-864-11	METAL CHIP	0	5%	1/16W	
R211	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R213	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R216	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R217	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R218	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R219	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R220	1-216-811-11	METAL CHIP	150	5%	1/16W	
R221	1-216-864-11	METAL CHIP	0	5%	1/16W	
R222	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R223	1-216-835-11	METAL CHIP	15K	5%	1/16W	
R224	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R226	1-216-818-11	METAL CHIP	560	5%	1/16W	
R228	1-216-812-11	METAL CHIP	180	5%	1/16W	
R231	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R232	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R242	1-216-818-11	METAL CHIP	560	5%	1/16W	
R243	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R253	1-216-820-11	METAL CHIP	820	5%	1/16W	
R254	1-216-820-11	METAL CHIP	820	5%	1/16W	
R255	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R256	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R257	1-216-809-11	METAL CHIP	100	5%	1/16W	
R258	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R259	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R260	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R263	1-216-864-11	METAL CHIP	0	5%	1/16W	
R266	1-216-864-11	METAL CHIP	0	5%	1/16W	
R267	1-216-864-11	METAL CHIP	0	5%	1/16W	
R270	1-216-864-11	METAL CHIP	0	5%	1/16W	
R271	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R272	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R276	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R277	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R278	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R279	1-216-818-11	METAL CHIP	560	5%	1/16W	
R280	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R281	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R282	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R283	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R285	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R286	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R290	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R291	1-216-820-11	METAL CHIP	820	5%	1/16W	
R293	1-216-807-11	METAL CHIP	68	5%	1/16W	
R294	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R295	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R297	1-216-820-11	METAL CHIP	820	5%	1/16W	
R298	1-216-820-11	METAL CHIP	820	5%	1/16W	
R299	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R300	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R301	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R304	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R306	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R307	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R309	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R310	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R312	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R314	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R315	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R316	1-216-817-11	METAL CHIP	470	5%	1/16W	
R320	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R321	1-216-819-11	METAL CHIP	680	5%	1/16W	
R324	1-216-817-11	METAL CHIP	470	5%	1/16W	
R329	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	

Ref.No.	Part No.	Description				Remark
R331	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R333	1-216-822-11	METAL CHIP	1.2K	5%	1/16W	
R334	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R335	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R338	1-216-864-11	METAL CHIP	0	5%	1/16W	
R339	1-216-864-11	METAL CHIP	0	5%	1/16W	
R346	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R347	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
R352	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R353	1-216-832-11	METAL CHIP	8.2K	5%	1/16W	
R354	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R355	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R356	1-216-817-11	METAL CHIP	470	5%	1/16W	
R357	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	
R358	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R359	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R360	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R362	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R363	1-216-864-11	METAL CHIP	0	5%	1/16W	
R366	1-216-844-11	METAL CHIP	82K	5%	1/16W	
R369	1-216-864-11	METAL CHIP	0	5%	1/16W	
R370	1-216-864-11	METAL CHIP	0	5%	1/16W	
R371	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R376	1-216-817-11	METAL CHIP	470	5%	1/16W	
R377	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R378	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R379	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R381	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R386	1-216-842-11	METAL CHIP	56K	5%	1/16W	
R387	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R388	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R389	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R390	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R391	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R392	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R393	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R394	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R395	1-216-864-11	METAL CHIP	0	5%	1/16W	
R396	1-216-864-11	METAL CHIP	0	5%	1/16W	
R397	1-216-828-11	METAL CHIP	3.9K	5%	1/16W	
R398	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R401	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R403	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R404	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R405	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R406	1-216-809-11	METAL CHIP	100	5%	1/16W	
R407	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R408	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R409	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R410	1-216-821-11	METAL CHIP	1K	5%	1/16W	

Ref.No.	Part No.	Description				Remark
R411	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R412	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R413	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R414	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R415	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R417	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R418	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R419	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R420	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R421	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R422	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R423	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R424	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R425	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R426	1-216-852-11	METAL CHIP	390K	5%	1/16W	
R427	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R428	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R429	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R430	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R431	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R432	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R433	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R435	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R436	1-216-864-11	METAL CHIP	0	5%	1/16W	
R437	1-216-817-11	METAL CHIP	470	5%	1/16W	
R438	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R439	1-216-864-11	METAL CHIP	0	5%	1/16W	
R441	1-216-864-11	METAL CHIP	0	5%	1/16W	
R442	1-216-864-11	METAL CHIP	0	5%	1/16W	
R443	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R445	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R447	1-216-864-11	METAL CHIP	0	5%	1/16W	(TR28/TR30)
R448	1-216-809-11	METAL CHIP	100	5%	1/16W	(TR28/TR30)
R449	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R450	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R451	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R452	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R453	1-216-841-11	METAL CHIP	47K	5%	1/16W	(TR28/TR30)
R454	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R456	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R457	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R460	1-216-864-11	METAL CHIP	0	5%	1/16W	
R461	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R462	1-216-809-11	METAL CHIP	100	5%	1/16W	
R463	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R468	1-216-039-00	METAL CHIP	390	5%	1/10W	
R469	1-216-838-11	METAL CHIP	27K	5%	1/16W	
R470	1-216-838-11	METAL CHIP	27K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R471	1-216-838-11	METAL CHIP	27K	5%	1/16W	
R472	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R473	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R474	1-217-671-11	METAL CHIP	1	5%	1/10W	
R475	1-217-671-11	METAL CHIP	1	5%	1/10W	
R476	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R479	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R480	1-217-671-11	METAL CHIP	1	5%	1/10W	
R481	1-217-671-11	METAL CHIP	1	5%	1/10W	
R484	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R485	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R487	1-216-864-11	METAL CHIP	0	5%	1/16W	
R488	1-216-809-11	METAL CHIP	100	5%	1/16W	
R489	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R490	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R491	1-216-296-91	METAL GLAZE	0	5%	1/8W	(TR28/TR30)
R493	1-216-864-11	METAL CHIP	0	5%	1/16W	
R496	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	(TR28/TR30)
R497	1-216-852-11	METAL CHIP	390K	5%	1/16W	(TR350/TR350PK)
R498	1-216-864-11	METAL CHIP	0	5%	1/16W	
		< NETWORK >				
RB401	1-236-442-11	NETWORK, RES 330K				
RB402	1-236-907-11	NETWORK, RES 100K				
RB403	1-236-907-11	NETWORK, RES 100K				
RB404	1-236-908-11	NETWORK, RES 10K				
RB405	1-236-436-11	NETWORK, RES 100K				
RB406	1-236-908-11	NETWORK, RES 10K				
RB407	1-236-907-11	NETWORK, RES 100K				
RB408	1-236-908-11	NETWORK, RES 10K				
RB409	1-236-904-11	NETWORK, RES 1K				
RB410	1-236-412-11	NETWORK, RES 1.0K				
RB411	1-236-424-11	NETWORK, RES 10K				
RB414	1-236-904-11	NETWORK, RES 1K				
RB416	1-236-412-11	NETWORK, RES 1.0K				
RB418	1-236-408-11	NETWORK, RES 470				
RB419	1-236-412-11	NETWORK, RES 1.0K (TR28/TR30)				
RB420	1-236-904-11	NETWORK, RES 1K (TR28/TR30)				
RB421	1-236-908-11	NETWORK, RES 10K				
RB422	1-236-424-11	NETWORK, RES 10K				
RB423	1-236-424-11	NETWORK, RES 10K				
RB424	1-236-424-11	NETWORK, RES 10K				
RB425	1-236-424-11	NETWORK, RES 10K				
RB426	1-236-412-11	NETWORK, RES 1.0K				
		< VARIABLE RESISTOR >				
RV151	1-238-087-11	RES, ADJ, CERMET 1K				

Ref. No.	Part No.	Description	Remark
		< FLEXIBLE BOARD >	
W001	1-696-489-11	FP-588 FLEXIBLE BOARD	
W405	1-644-285-11	FP-572 FLEXIBLE BOARD	
		< VIBRATOR >	
X151	1-579-365-21	VIBRATOR, CRYSTAL (3.58MHz)	
X401	1-579-063-21	VIBRATOR, CERAMIC (4.19MHz)	
X402	1-579-049-21	VIBRATOR, CRYSTAL (32.768kHz)	
X403	1-579-367-21	VABRATOR, CRYSTAL (11.89MHz)	
X404	1-579-551-11	VIBRATOR, CERAMIC (700kHz) (TR28/TR30)	
**********			
		MISCELLANEOUS	
		**********	
18	1-696-487-11	CABLE, FLAT (FFC-90)	
85	1-692-257-11	SWITCH, PUSH (ZOOM)	
105	1-547-548-11	LENS, ZOOM (VCL-6210WC) (TYPE A)	
105	1-547-630-11	LENS, ZOOM (VCL-6210WF) (TYPE B)	
108	1-547-558-21	FILTER BLOCK, OPTICAL	
257	1-568-323-11	CONNECTOR, BOARD TO BOARD 4P	
321	1-641-643-12	FP-444 FLEXIBLE BOARD	
322	1-691-254-13	CONNECTOR, TRANSLATION 10P	
324	1-641-639-13	FP-442 FLEXIBLE BOARD	
325	1-645-271-11	FP-575 FLEXIBLE BOARD	
H516	1-550-104-32	HOLDER, BATTERY	
IC875	A-7030-368-A	CCD BLOCK ASSY (054 SERVICE) (CCD IMAGER)	
J901	1-537-281-41	TERMINAL BOARD	
M901	A-7048-564-A	DRUM ASSY (DGH-78A-R)	
M902	8-835-477-01	MOTOR, DC SCE-0101A (CAPSTAN)	
M903	A-7040-304-A	MOTOR BLOCK ASSY, LM (LOADING)	
M904	3-708-494-11	METER ASSY, IG (IRIS) (TYPE A)	
M904	3-708-653-01	IRIS UNIT (TYPE B)	
M905	3-708-491-01	MOTOR ASSY, STEPPING (FOCUS) (TYPE A)	
M905	3-708-656-01	MOTOR UNIT, FOCUS (TYPE B)	
M906	3-708-492-01	MOTOR ASSY, PZ (ZOOM) (TYPE A)	
M906	3-708-654-01	MOTOR UNIT, ZOOM (TYPE B)	
S001	1-572-986-11	SWITCH, ROTARY (ENCODER)	
S002	1-572-987-11	SWITCH, PUSH (3 KEY)	(REC PROOF, ME/MP, MP/MP-HG)
S005	1-570-771-21	SWITCH (C DOWN)	
⚠V901	1-452-565-11	CRT ASSY (M01KKD70WB)	
W001	1-696-489-11	FP-588 FLEXIBLE BOARD	
W405	1-644-285-11	FP-572 FLEXIBLE BOARD	
W519	1-696-488-11	CABLE, FLAT (FFC-92)	
W521	1-642-186-11	FP-437 FLEXIBLE BOARD	
W522	1-696-490-11	FP-589 FLEXIBLE BOARD	
⚠W501	1-540-019-21	SOCKET ASSY, CRT	
W971	1-696-484-11	CABLE, FLAT (FFC-87)	
W986	1-696-621-11	FP-590 FLEXIBLE BOARD	
W987	1-696-622-11	FP-591 FLEXIBLE BOARD	

Be sure to read "Precautions for Replacement of CCD Imager" on page 76 when changing the CCD imager.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
W991	1-696-483-11	CABLE, FLAT (FFC-86)	

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ACCESSORIES & PACKING MATERIALS
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	1-467-574-21	REMOTE COMMANDER (RMT-708) (TR28/TR30)	
	1-574-039-11	CORD, CONNECTION (TR350:Tourist) (A/V connecting cable (monaural), 1.5m)	
	3-738-517-01	BELT (S), SHOULDER (TR28/TR30)	
	3-758-358-11	MANUAL, INSTRUCTION (ENGLISH, SPANISH)	(TR350/TR350PK)
	3-758-358-41	MANUAL, INSTRUCTION (CHINESE) (TR350:E)	
	3-758-359-21	MANUAL, INSTRUCTION (ENGLISH) (TR28/TR30)	
	3-758-359-31	MANUAL, INSTRUCTION (FRENCH) (TR30:CND)	
	3-758-931-41	MANUAL, INSTRUCTION (KOREAN)	(TR350:Tourist)
*	3-795-581-21	SAFEGUARD (SONY), IMPORTANT	(TR28/TR30:US)
*	3-949-004-01	CUSHION, ACC (TR28/TR30/TR350)	
*	3-949-005-01	CUSHION (LOWER) (TR28/TR30/TR350)	
*	3-950-791-01	CUSHION (FRONT), INNER (TR350PK)	
*	3-950-792-01	CUSHION (REAR), INNER (TR350PK)	
*	3-950-795-31	INDIVIDUAL CARTON (TR350PK)	
*	3-956-637-01	PLATE, INNER (TR350PK)	
	3-956-650-01	CASE, CARRYING (TR350PK)	
*	3-958-245-21	INDIVIDUAL CARTON (TR350)	
*	3-958-245-31	INDIVIDUAL CARTON (TR30)	
*	3-958-245-41	INDIVIDUAL CARTON (TR28)	
**	AC-V25/V25A	AC POWER ADAPTOR	
***	NP-55	BATTERY PACK	

Note.

** MARK PARTS IS AVAILABLE FOR REPAIR SERVICE.
*** MARK PARTS IS AVAILABLE AS AN OPTIONAL ACCESSORY.

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****
HARDWARE LIST
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#1	7-627-853-57	PRECISION SCREW +P 2X5

SECTION 7
CAMERA SECTION ADJUSTMENTS

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 192.

7-1. PREPARATIONS BEFORE ADJUSTMENT (CAMERA SECTION)

7-1-1. List of Service Tools

- Oscilloscope
- Adjusting driver
- Stabilized power supply
- Color monitor
- Vectorscope
- Digital voltmeter

Ref. No.	Name	Part Code	Usage
J-1	Filter for color temperature correction (C14)	J-6080-058-A	Auto white balance adjustment/check White balance adjustment/check
J-2	ND filter 1.0	J-6080-808-A	Max gain adjustment (2 used) White balance check
	ND filter 0.4	J-6080-806-A	Max gain adjustment
	ND filter 0.3	J-6080-818-A	White balance adjustment
	ND filter 0.1	J-6080-807-A	Max gain adjustment
J-3	Pattern box PTB-500	J-6029-140-A	
J-4	Color chart for pattern box	J-6020-250-A	
J-5	Adjusting remote control unit (RM-95-remodeled in part)Note 1	J-6082-053-B	
J-6	Extension cord (10P, 1 mm)	J-6082-064-A	For extension of JK-99 board
J-7	Extension cord (20P, 0.8 mm)	J-6082-196-A	For extension of CN-84 board (Cabinet (R)) (For the video and the camera section adjustment)
			For extension of AU-171 board (During the repair of AU-171 board)
J-8	Extension cord (16P, 0.8 mm)	J-6082-136-A	For the extension of the lens block (During the repair of the camera section)
J-9	Relay board (21P, 0.5 mm)Note 2	J-6082-176-A	For the extension of the lens block (During the repair of the camera section)
J-10	Measuring pin for camera section	J-6082-139-A	For the camera section adjustment
J-11	Extension cord (42P, 0.8 mm)	J-6082-195-A	For the extension of DD-67 board (During the repair of the video section)
J-12	Siemens star	J-6080-875-A	For flange back check
J-13	Extension cord (20P, 0.5 mm)Note 2	J-6082-138-A	For extension between the lens block (FPC) and VC-147 board (CN851) (During the repair of the camera section)
J-14	Extension board (30P, 0.8 mm)	J-6082-167-A	For the extension of VS-116 board (For the mecha deck check)

Note 1: If the micro processor IC in the adjusting remote control unit is not the new micro processor (UPD7503G-C56-12), the switchover of the page cannot be carried out. In this case, replace with the new micro processor (8-759-148-35).

Note 2: The extension code (J-6082-138-A) is also attached with a 21P, 0.5 mm code. Connect this code to the relay board (J-6082-176-A) for extensions between the lens block (FPC) and VC-147 board (CN851).

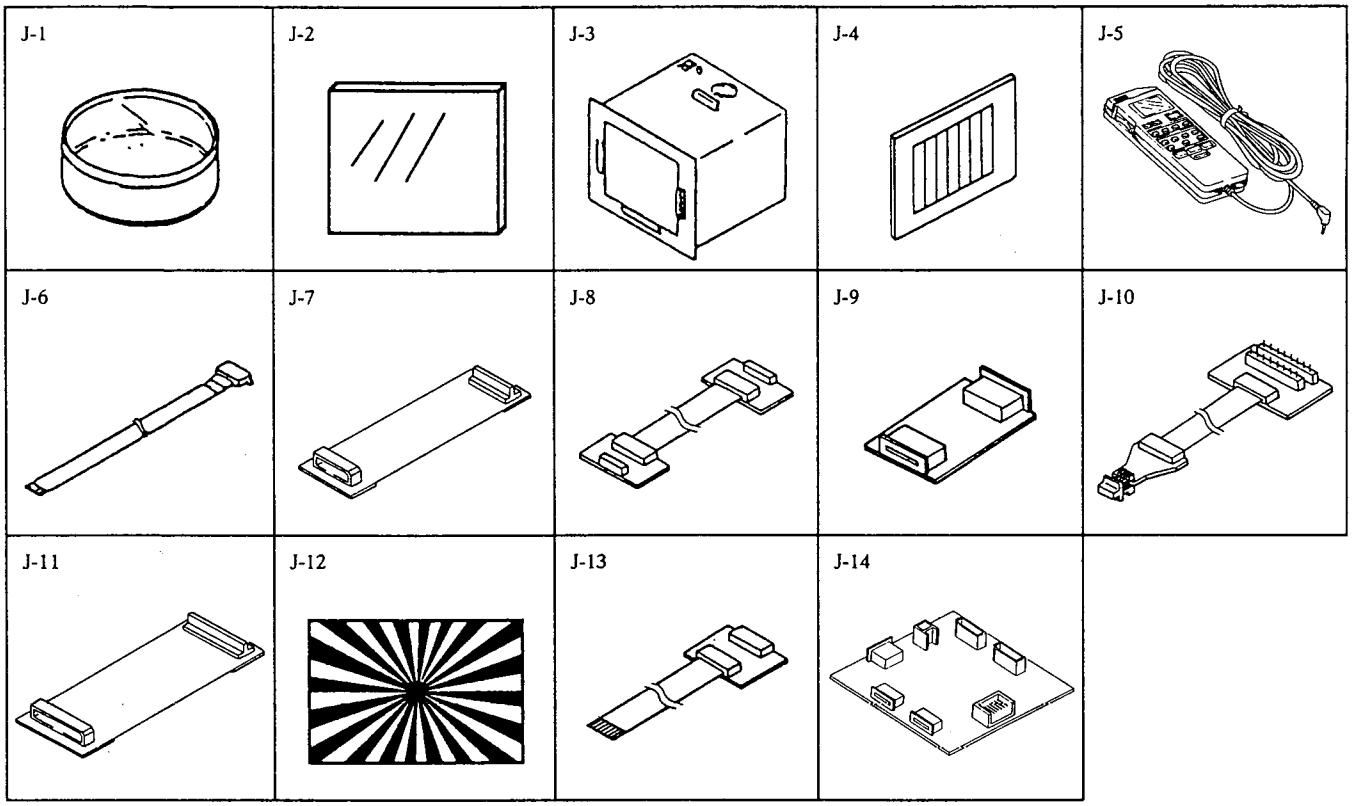


Fig. 7-1.

7-1-2. Preparations

Note: For further details on how to remove the cabinet and each board, refer to "2. Disassembly".

1) Connect the equipments for adjustment as shown in Fig. 7-3.
2) The EVF (Electronic viewfinder) is required for checking the white balance mode and shutter speeds. If the EVF is not required, remove the VS-116 board CN102.

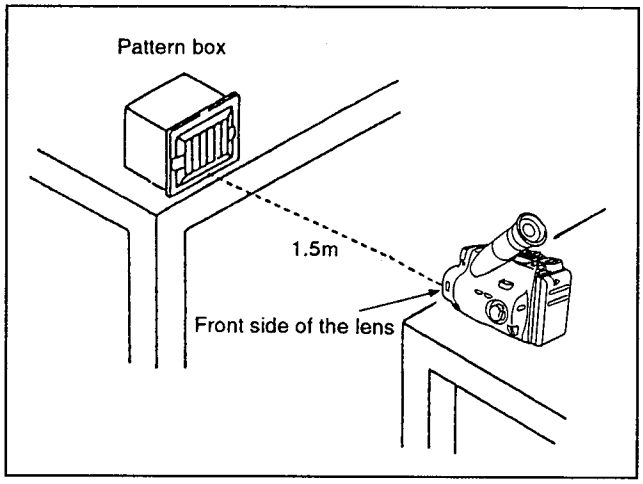


Fig. 7-2.

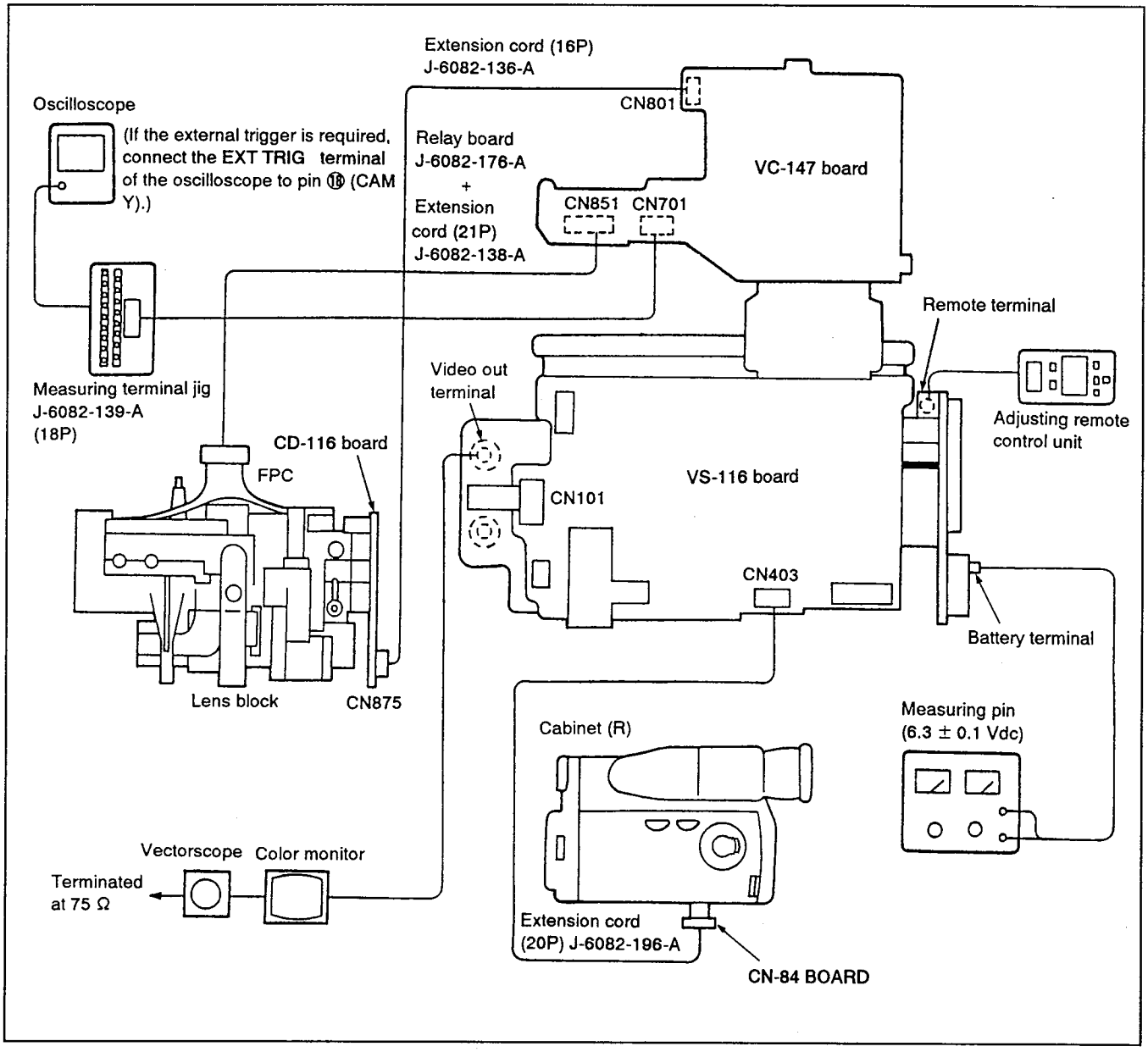


Fig. 7-3.

7-1-3. Precautions

1. Switch settings

Adjust the switches to the following positions, and perform the adjustments without inserting the tape, unless specified otherwise.

1. Camera/player power switch (CF-34 board S997) ····Camera
2. Standby switch (SW-223 board S519)····· Standby
3. LENS OPEN switch (MF-214 board S973) ····· OPEN

2. Adjustment Procedure

Perform in the given order as a rule.

3. Subject

1) Color bar chart (Standard picture frame)
   Adjust the display frame as shown in Fig. 7-4. if adjustments are performed using the color bar chart.
   (Standard picture frame)
2) White pattern (Standard picture frame)
   Remove the color bar chart from the pattern box, and so that the white pattern will be displayed.
   (In this case don't touch ZOOM SW).

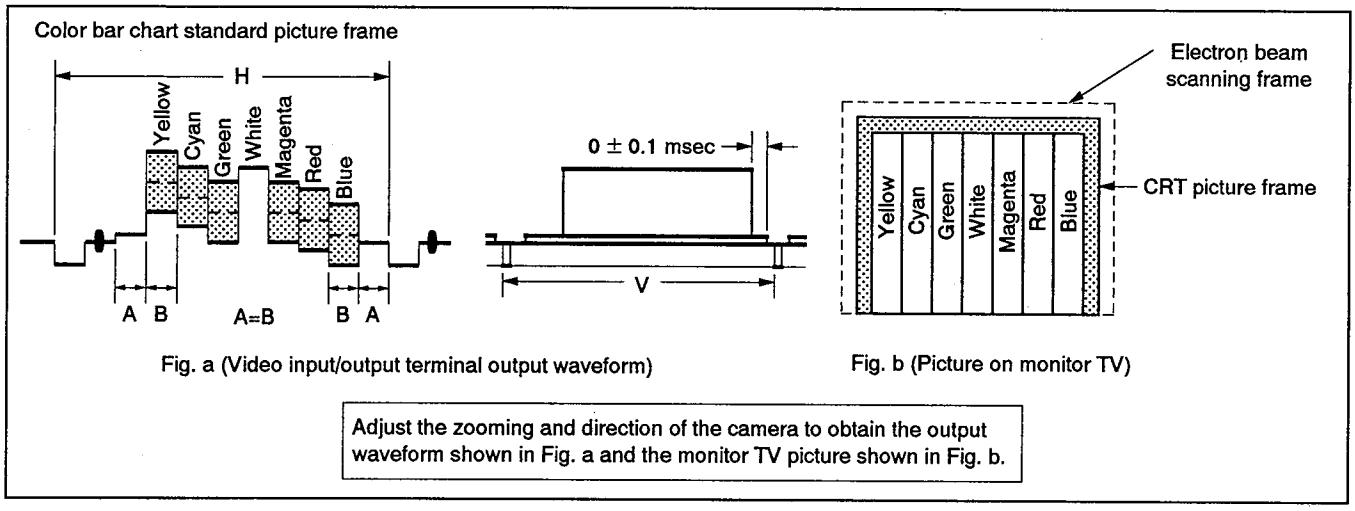


Fig. 7-4.

3) Chart for flange back adjustment
   Combine a white A0 size (1189 mm× 841 mm) paper to a black one, and make the chart shown in Fig. 7-5.

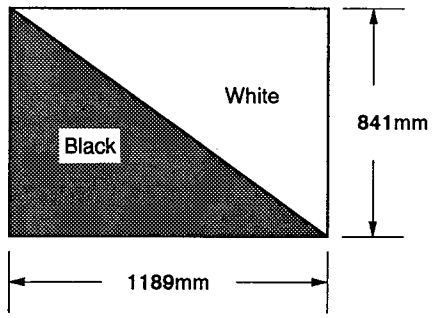


Fig. 7-5.

Note: Use the non-reflecting and non-glazing vellum paper whose size is more than A0, and make the boundary between white and black to be smoothly flat.

7-1-4. Adjusting Remote Control Unit

The camera section is adjusted by changing the constant using the coefficient of the digital signal processing calculation, or modifying the output voltage of EVR IC (VC-147 board IC702). These processes are carried out by the camera micro processor (VC-147 board IC709). This micro processor reads the data written in the non-volatile memory (VC-147 board IC712), and transmits it to the digital signal processing circuit and EVR.

The adjusting remote control unit is used for rewriting the adjustment data written in the non-volatile memory necessary for performing the adjustments.

The adjusting remote control unit uses the remote control signal line (LANC) to correspond mutually with the camera micro processor. The page, address and the up/down command of the data can be transmitted from the remote control unit to the camera micro processor. On the other hand, the page, address, and data can also be transmitted the other way round.

1. Using the adjusting remote control unit

1) Connect the adjusting remote control unit to the remote terminal (DD-67 board J902).
2) Adjust the HOLD switch of the adjusting remote control unit to HOLD (SERVICE position).
   If it has been properly connected, the LCD on the adjusting remote control unit will show the display in Fig. 7-6.

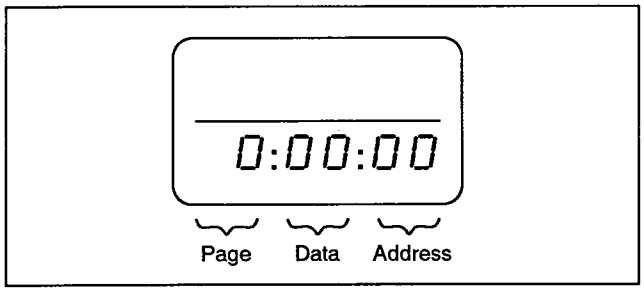


Fig. 7-6.

3) Operate the adjusting remote control unit as follows.
   - Changing the page
     The page will increase when the EDIT SEARCH+ button is pressed. It will decrease when the EDIT SEARCH– button is pressed. There are altogether 16 pages, from 0 to F.

Hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Display on LCD	0	1	2	3	4	5	6	7	8	9	A	b	c	d	E	F
Decimal notation conversion value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 7-1.

   - Changing the address
     The address will increase when the FF (▶▶) button is pressed, and decrease when the REW (◀◀) button is pressed. There are altogether 256 addresses, from 00 to FF.
   - Changing the data (Data setting)
     The data will increase when the PLAY (▶) button is pressed, and decrease when the STOP (■) button is pressed.
     There are altogether 256 data, from 00 to FF.
   - Writing the adjustment data
     It is necessary to press the PAUSE button to write the adjustment data (F page, D page) in the non-volatile memory.
     (The new adjustment data will not be recorded in the non-volatile memory if this operation is not performed.)
4) Select page: 6, address: 00, and adjust the data to 01. This releases the write protect of page F, and the camera section (F page) can be adjusted.
5) After completing all adjustments, turn off the main power (6.3V) once. This can release the adjustment mode (other than page F).

2. Precautions upon using the adjusting remote control unit

The correct adjustment data may be erased at times, due to operation errors of the adjusting remote control unit. To prevent this from occurring, it is recommended that all adjustment data be recorded in the memory before beginning adjustments, and the new adjustment data be recorded in the memory after each adjustment.

7-1-5. Page F Address List

Note 1: The data listed in the adjustment data memo column are fixed values.

Note 2: The adjustment data initial values are the values after performing "Page F Data Initialization" and "Page F Data Modification". They are different from the value after performing all the adjustments.

Address	Name	Function [ ] Indicate the adjustment voltage output terminal	Adjustment data	
			Initial value	Memo column
00	ID	Set ID	3D	3D
01	FADER LEVEL	AE REF level modification during fader	E0	E0
02	FADER ENDTIM	The setting of the AE REF modulation time during fader	10	10
03	CS SL	Carrier balance adjustment	35	
04	VSUB	CCD imager V SUB adjustment [IC702 ③]	80	
05	VPGH	CCD imager VRG adjustment [IC702 ④]	80	
06	VREF Y	Camera core Y D/A standard voltage, SYNC level adjustment [IC702 ⑤]	7B	
07	VREF C	Camera core CHROMA D/A standard voltage, BURST level adjustment [IC702 ⑥]	99	
08	HALL GAIN	Hole amplifier gain adjustment [IC702 ⑦] } HALL adjustment	47	
09	HALL OFFSET	Hole amplifier offset adjustment [IC702 ⑧] } HALL adjustment	71	
0A	LOWLIGHT CS	Low luminance intensity REF level modulation start setting	C0	C0
0B	REF 2V	2V standard voltage for hole element [IC702 ⑫]	68	68
0C	AD REF	Black level setting during A/D conversion, A/D off set adjustment [IC702 ⑬]	72	
0D	CORE DETH	CCD correction control	04	04
0E	CORE VTR DELAY	1HDL longitudinal setting during VTR playback	16	16
0F	CORE APCN4	Horizontal aperture setting	35	35
10	CORE APCN5	Vertical aperture setting	3D	3D
11	CORE EFECT	Special effect control	A8	A8
12	CORE MATR	BLUE matrix constant	27	27
13	CORE MATB	RED matrix constant	6C	6C
14	CORE BURST LEVEL	Burst flag level setting, color modulation ON/OFF Data: 2C — Adjustment mode Adjustment: Normal level Data: 2E — Adjustment mode Adjustment: Color modulation stopped	2C	2C
15	CORE CHROMA DLY	Y/C delay adjustment	07	07
16	CORE Y SETUP	Set up level setting	06	06
17	CORE VHAPCN	Slice and level setting of the aperture signal	18	18
18	CORE B-Y GAIN	B–Y GAIN } Color reproduction adjustments	13	
19	CORE R-Y GAIN	R–Y GAIN } Color reproduction adjustments	11	
1A	CORE R-Y HUE	R–Y HUE } Color reproduction adjustments	FF	
1B	CORE B-Y HUE	B–Y HUE } Color reproduction adjustments	FD	
1C	CS/APCCUT	Low luminance intensity aperture and chroma suppress level	22	22

Table 7-2 (1).

Address	Name	Function [ ] Indicate the adjustment voltage output terminal		Adjustment data	
				Initial value	Memo column
1D	NEXT LINE DEFECT BIT	CCD correction pattern	CCD imager correction data write	00	
1E	CCD DEFECT0	CCD correction data		00	
1F	CCD DEFECT1	CCD correction data		00	
20	CCD DEFECT2	CCD correction data		00	
21	CCD DEFECT3	CCD correction data		00	
22	CCD DEFECT4	CCD correction data		00	
23	CCD DEFECT5	CCD correction data		00	
24	CCD DEFECT6	CCD correction data		00	
25	CCD DEFECT7	CCD correction data		00	
26	CCD DEFECT8	CCD correction data		00	
27	CCD DEFECT9	CCD correction data		00	
28	CCD DEFECT10	CCD correction data		00	
29	CCD DEFECT11	CCD correction data		00	
2A	CCD DEFECT12	CCD correction data		00	
2B	CCD DEFECT13	CCD correction data		00	
2C	CCD DEFECT14	CCD correction data		00	
2D	RREF L	3200k Red standard data LSB	Auto white balance preset adjustment	72	
2E	RREF H	3200k Red standard data MSB		5F	
2F	GREF L	3200k Green standard data LSB		D4	
30	GREF H	3200k Green standard data MSB		63	
31	BREF L	3200k Blue standard data LSB		3B	
32	BREF H	3200k Blue standard data MSB		2C	
33	RCONTREF	3200k RCONT adjustment value	Pre-white balance adjustment	42	
34	BCONTREF	3200k BCONT adjustment value		4A	
35	AWB NOWM R	Red regular correction coefficient	Auto white balance adjustment	7E	
36	AWB NORM B	Blue regular correction coefficient		96	
37	AWB SHUT IN	Indoor determination shutter data		A8	A8
38	ABW SHUT OUT	Outdoor determination shutter data		A0	A0
39	AWB IRIS IN	Indoor determination hole data	IRIS IN/OUT adjustment	79	
3A	AWB IRIS OUT	Outdoor determination hole data		7F	
3B	AWB G LEVEL	High luminance section green integral level		02	02
3C	AWB G WIDTH	High luminance section green integral level range		03	03
3D	DMAT HUE	Variable linear matrix HUE coefficient	Linear matrix adjustment	00	
3E	DMAT GAIN	Variable linear matrix GAIN coefficient		00	
3F	AWB SELECT	AWB mode selection		00	00
40	AWB DIFF	Standard difference from the outdoor fixed value		0A	0A
41	AWB BOTTOM SLP R	AWB incoming frame bottom R coefficient		48	48
42	AWB BOTTOM SLP B	AWB incoming frame bottom B coefficient		78	78
43	AWB MIDDLE SLP R	AWB incoming frame middle R coefficient		60	60
44	AWB MIDDLE SLP B	AWB incoming frame middle B coefficient		40	40
45	AWB TOP SLP R	AWB incoming frame top R coefficient		66	66
46	AWB TOP SLP B	AWB incoming frame top B coefficient		18	18

Table 7-2 (2).

Address	Name	Function [ ] Indicate the adjustment voltage output terminal	Adjustment data	
			Initial value	Memo column
47	AWB KEIKO R	AWB incoming frame fluorescent light R coefficient	66	66
48	AWB KEIKO B	AWB incoming frame fluorescent light B coefficient	18	18
49	AWB BOTTOM UP	AWB incoming frame bottom upper value	C2	C2
4A	AWB BOTTOM DWN	AWB incoming frame bottom lower value	8C	8C
4B	AWB MIDDLE UP	AWB incoming frame middle upper value	AD	AD
4C	AWB MIDDLE DWN	AWB incoming frame middle lower value	96	96
4D	AWB TOP UP	AWB incoming frame top upper value	78	78
4E	AWB TOP DWN	AWB incoming frame top lower value	60	60
4F	AWB KEIKO	AWB incoming frame fluorescent light output lower value	66	66
50	AWB KEIKO DWN	AWB incoming frame fluorescent light lower value	59	59
51	AWB R TOP LMT	AWB incoming frame Rcont upper value	6E	6E
52	AWB R DWN LMT	AWB incoming frame Rcont lower value	20	20
53	AWB B TOP LMT	AWB incoming frame Bcont upper value	83	83
54	AWB B IN TOP	AWB incoming frame Bcont	67	67
55	AWB B IN MAX	AWB incoming frame Bcont	5C	5C
56	AWB B OUT MIN	AWB incoming frame Bcont	5C	5C
57	AWB B OUT DWN	AWB incoming frame Bcont	4A	4A
58	AWB B DWN LMT	AWB incoming frame Bcont lower value	1B	1B
59	AWB LL LMT	Low luminance intensity limiter	06	06
5A	AWB T M DIVID	AWB incoming frame upper, middle border value	5E	5E
5B	AWB B M DIVID	AWB incoming frame middle, lower border value	39	39
5C	AWB DELAY TM	AWB tracking speed Data: 01 — High speed tracking mode; 10 — Normal	10	10
5D	AWB FAST TM	AWB initial high speed tracking amount	40	40
5E	AWB OUT HYS OFF	AWB outdoor hysteresis off difference	0C	0C
5F	AWB OUT B HYS	AWB outdoor hysteresis amount	06	06
60	AWB MODE	AWB adjustment mode Data: 00 — Normal; D0 — AWB adjustment mode; F1 — All area tracking mode	00	00
61	AE REFL	Reference value (lower) for AE	00	00
62	AE REFH	Reference value (upper) for AE	1E	1E
63	AGC MIN	AGC MIN value (AGCREF value), IRIS level adjustment	E3	
64	AE MIML	Low luminance intensity side limiter (MAXGAIN), MAX GAIN adjustment	32	
65	AE MAXL	High luminance intensity side limiter (lower)	80	80
66	IRIS OFFSET	Iris ROM table OPEN side off set	D0	D0
67	AE KEISU	Correction coefficient during detection weighting	00	00
68	AE FUNCTION	SW for turning each AE function ON and OFF	00	00

Table 7-2 (3).

Address	Name	Function [ ] Indicate the adjustment voltage output terminal	Adjustment data	
			Initial value	Memo column
69	BL HOSEIH	Forcible back light level setting (upper)	40	40
6A	JITEISU DOWN	Constant during loop response DOWN side	30	30
6B	JITEISU UP	Constant during loop response UP side	10	10
6C	AE KNEE	KNEE setting value for AE	FF	FF
6D	ORETEN SET	Variable point due to time constant error amount	13	13
6E	OMOMIOUT	Outer frame weighting amount	40	40
6F	AFC WIDE	Coefficient required for the ANF integral loop	03	03
70	AFC GAIN	Loop gain of the flickerless loop	01	01
71	AFC LIMIL	Limiter corresponding to the error rate (Lower)	60	60
72	HIST P KEISU	Histocomp level setting P for counter light determination	20	20
73	HIST H KEISU	Histocomp level setting H for counter light determination	E0	E0
74	HIST L KEISU	Histocomp level setting L for counter light determination	90	90
75	GYAKOU JITEISU	Constant during auto back light response	08	08
76	SABUN LIMIT	Limiter for counter light determination	40	40
77	FUZZY RULE1	Correction amount 1 for auto back light	A0	A0
78	FUZZY RULE2	Correction amount 2 for auto back light	D0	D0
79	FUZZY RULE3	Correction amount 3 for auto back light	E0	E0
7A	FUZZY RULE4	Correction amount 4 for auto back light	B0	B0
7B	FUZZY RULE5	Correction amount 5 for auto back light	70	70
7C	FUZZY RULE6	Correction amount 6 for auto back light	90	90
7D	FUZZY RULE7	Correction amount 7 for auto back light	B0	B0
7E	FUZZY RULE8	Correction amount 8 for auto back light	B8	B8
7F	FUZZY RULE9	Correction amount 9 for auto back light	98	98
80	FUZZY RULE10	Correction amount 10 for auto back light	78	78
81	IRIS MIN L	Iris limit value (lower)	42	42
82	IRIS MIN H	Iris limit value (upper)	02	02
83	DELTA SHUT GAIN	Shutter smoothing value setting	04	04
84	AE WAKUH	Frame data for AE detection (vertical line)	0F	0F
85	AE WAKUV	Frame data for AE detection (horizontal line)	4F	4F
86	WIDE LIMIT	ZOOM limiter WIDE (lower) } Flange back adjustment	DE	
87	WIDE LIMITH	ZOOM limiter WIDE (upper)	02	
88	TELE LIMIT	ZOOM limiter TELE (lower)	22	
89	TELE LIMITH	ZOOM limiter TELE (upper)	1D	
8A	STEP ZERO	Flange back value	90	
8B	STEP ZERO SPAN	Frange back value 2	A0	
8C	ZOOM SPD FAST	Zoom speed (fast)	60	60
8D	ZOOM SPD SUPER	Zoom speed (For adjustment)	59	59
8E	ZS INIT SLOW	Zoom speed initial value (slow)	59	59
8F	ZS INIT FAST	Zoom speed initial value (fast)	59	59
90	ZMSPD DAMIN	Zoom speed D/A MIN value	3D	3D
91	ZS K	Zoom servo coefficient K	11	11
92	ZS L	Zoom servo coefficient L	04	04

Table 7-2 (4).

<table>
<tr><th rowspan="2">Address</th><th rowspan="2">Name</th><th rowspan="2">Function
[ ] Indicate the adjustment voltage output terminal</th><th colspan="2">Adjustment data</th></tr>
<tr><th>Initial value</th><th>Memo column</th></tr>
<tr><td>93</td><td>ZP HYS</td><td>Zoom potential hysteresis</td><td>03</td><td>03</td></tr>
<tr><td>94</td><td>ZOOM SPD SLOW</td><td>Zoom speed (slow)</td><td>22</td><td>22</td></tr>
<tr><td>95</td><td>AF MD2THL</td><td>MODE2 THR</td><td>20</td><td>20</td></tr>
<tr><td>96</td><td>MAXCHG THR</td><td>MAX value renewal THR</td><td>1A</td><td>1A</td></tr>
<tr><td>97</td><td>ERR THRL</td><td>Wobbling width THR</td><td>18</td><td>18</td></tr>
<tr><td>98</td><td>WOB INTV</td><td>Wobbling second interval</td><td>04</td><td>04</td></tr>
<tr><td>99</td><td>ERRPOL THR</td><td>MODE2 error possible THR</td><td>13</td><td>13</td></tr>
<tr><td>9A</td><td>MAXCHK THR</td><td>MAX CHECK THR</td><td>12</td><td>12</td></tr>
<tr><td>9B</td><td>REWOB THR</td><td>Wobbling second THR</td><td>0A</td><td>0A</td></tr>
<tr><td>9C</td><td>MODE2 INOUT</td><td>MODE2 speed switchover</td><td>8B</td><td>8B</td></tr>
<tr><td>9D</td><td>SMLWD THR</td><td>Small frame THR</td><td>0A</td><td>0A</td></tr>
<tr><td>9E</td><td>ZOOM PULSE LIMIT</td><td>Maximum zoom pulse value</td><td>C6</td><td>C6</td></tr>
<tr><td>9F</td><td>ZOOM RIZE</td><td>Zoom rise minimum speed time</td><td>0A</td><td>0A</td></tr>
<tr><td>A0</td><td>FB CURVEPEAKL</td><td>Constant for flange back adjustment</td><td>F5</td><td>F5</td></tr>
<tr><td>A1</td><td>FB CURVEPEAKH</td><td>Constant for flange back adjustment</td><td>0B</td><td>0B</td></tr>
<tr><td>A2</td><td>FB ZOOMSL</td><td>Constant for flange back adjustment</td><td>02</td><td>02</td></tr>
<tr><td>A3</td><td>FB ZOOMSH</td><td>Constant for flange back adjustment</td><td>07</td><td>07</td></tr>
<tr><td>A4</td><td>LIMITREST WIDE</td><td>Zoom limiter WIDE side</td><td>14</td><td>14</td></tr>
<tr><td>A5</td><td>LIMITREST TELE</td><td>Zoom limiter TELE side</td><td>17</td><td>17</td></tr>
<tr><td>A6</td><td>FB PEAKTHR</td><td>Constant for flange back adjustment</td><td>FF</td><td>FF</td></tr>
<tr><td>A7</td><td>FB ZOOM SLOW</td><td>Constant for flange back adjustment</td><td>1C</td><td>1C</td></tr>
<tr><td>A8</td><td>DET IRIS ALT</td><td>Iris variation check THR</td><td>02</td><td>02</td></tr>
<tr><td>A9</td><td>DET AGC ALT</td><td>AGC variation check THR</td><td>02</td><td>02</td></tr>
<tr><td>AA</td><td>LIMIT INSURANCE</td><td>Focus limiter insurance value</td><td>02</td><td>02</td></tr>
<tr><td>AB</td><td>FOCUS MODE</td><td>Focus mode
<table><tr><th>Data</th><th>Adjustment mode</th></tr><tr><td>08</td><td>Zoom, Focus fixed</td></tr><tr><td>00</td><td>Normal</td></tr></table></td><td>00</td><td>00</td></tr>
<tr><td>AC</td><td>LENS ADJ MODE</td><td>Flange back adjustment mode
<table><tr><th>Data</th><th>Adjustment mode</th></tr><tr><td>00</td><td>Nomal</td></tr><tr><td>01</td><td>Flange back adjustment</td></tr></table></td><td>00</td><td>00</td></tr>
<tr><td>AD</td><td>LENS EMRG</td><td>Lens emergency</td><td>00</td><td>00</td></tr>
<tr><td>AE</td><td>NTSC PAL/H DEF DELAY</td><td>DELAY bit=0: NTSC, 1: PAL, bit4-7=CCD correction delay</td><td>20</td><td>20</td></tr>
<tr><td>AF</td><td>FT SW</td><td>DDS display mode switchover
<table><tr><th>Data</th><th>DDS display mode</th></tr><tr><td>00</td><td>Y sampling display</td></tr><tr><td>02</td><td>R–Y display</td></tr><tr><td>40</td><td>HALL data display</td></tr><tr><td>82</td><td>R ratio display</td></tr><tr><td>83</td><td>B ratio display</td></tr><tr><td>91</td><td>R, B ratio (M) display</td></tr><tr><td>B0</td><td>Focus step display</td></tr></table></td><td>00</td><td>00</td></tr>
</table>

Table 7-2 (5).

Address	Name	Function [ ] Indicate the adjustment voltage output terminal	Adjustment data	
			Initial value	Memo column
B0	CORE OTHER	CORE MODE DATA 13 byte	12	12
B1	CORE Y GAIN	CORE FIELD DATA 0 byte	3F	3F
B2	E LOW LIGHT START	Low light chroma suppress start point	30	30
B3				
B4	YAKEI LEVEL	YAKEI mode gain setting value	40	40
B5				
B6	ZOOM DROP 1	F-No. dropping (1) by Zoom lens	60	60
B7	ZOOM DROP 2	F-No. dropping (2) by Zoom lens	75	75
B8				
B9				
BA	AWB IN B HYS	Hysteresis of AWB indoor BLUE	04	04
BB	AWB IN R HYS	Hysteresis of AWB indoor RED	02	02
BC	AWB KAKE NORM R	ADD: 35 NORM R × 1000H	20	20
BD	AWB KAKE NORM B	ADD: 36 NORM B × 1000H	20	20
BE	MF STEP CHNGE	Coefficent of MODE 2 THR	46	46
BF	MD2 LOWCON SPD	Speed for Low-contrast at MODE 2	07	07
C0	MAX CHECK NG CNT	MAX CHECK NG count	1E	1E
C1	AF CONTROL FLAG		0E	0E
C2	AE Y THR	Low light AE fluctuation THR 1	28	28
C3	AE Y MIN	Low light AE fluctuation THR 2	20	20
C4	MD2 SPD	Focus speed at MODE 2	61	61
C5	AE CHECK	Re-start up AE THR	10	10
C6	LOW CON THR	THR 1 for judging Low-contrast at MODE 2	10	10
C7	LOW CON THR2	THR 2 for judging Low-contrast at MODE 2	20	20
C8~EF		Not used		
F0		Input column of the unit ID No., etc. Not related to unit operations.	FF	
F1			FF	
F2			FF	
F3			FF	
F4			FF	
F5			FF	
F6			FF	
F7			FF	
F8			FF	
F9			FF	
FA			FF	
FB			FF	
FC			FF	
FD			FF	
FE			FF	
FF			FF	

Table 7-2 (6).

7-1-6. 6 Page, 1 Page Address List

The camera adjustment mode can be set by performing the following data settings at page: 6 or page: 1. (These page data can be set temporary, but when the main power (6.3V) is turned off, the original value (normal value) will be returned.

Therefore, these adjustment modes can be released very simply by turning the main power off.)

(Example) The camera adjustment mode (1) is set by setting data: 01 to page: 6, address: 00. The F page write protect will also be released.

1. Page 6

Address	Adjustment Mode	Data	Function
00	Camera adjustment mode	01	Camera adjustment mode (1), F page write protect released
		10	Normal
		11	Camera adjustment mode (2), F page write protect released
01	Camera adjustment switch **Note:** To set this address adjustment mode, it is necessary to press the PAUSE button of the adjusting remote control unit after setting the data.	00	Normal
		01	IRIS OPEN, AGC HOLD
		03	IRIS CLOSE1, AGC HOLD
		05	IRIS CLOSE2, AGC MIN
		07	IRIS CLOSE3, AGC MAX
		09	ND0.5 SHUTTER (PAL=1/160, NTSC=1/190)
		0B	ND0.8 SHUTTER (PAL=1/320, NTSC=1/380)
		0D	AWB PRESET1: 3200K PRESET DATA take in
		0F	WB 3200K PRESET: Indoor white balance mode
		11	AWB PRESET2: Preparation of 3200K PRESET DATA take in
		13	ZOOM HUNTING1 ZOOM SPDSLOW
		15	ZOOM HUNTING2 ZOOM SPDFAST
		17	AE FB adjustment mode (IRIS: OPEN, AGC: REF, SHUTTER: 1/100 (NTSC), 1/120 (PAL))
		1D	EEPROM PRE WRITE: Page F initial data write
05	Shutter mode	00	NTSC=1/60, PAL=1/50
		19	1/2000
06	FOCUS limiter ON/OFF	00	FOCUS limiter ON (Normal)
		01	FOCUS limiter OFF
07	ZOOM limiter ON/OFF	00	ZOOM limiter ON (Normal)
		01	ZOOM limiter OFF
08	ZOOM speed SLOW/FAST	00	Normal
		01	ZOOM speed SLOW
		02	ZOOM speed FAST
		03	ZOOM speed SUPER SLOW
09 ★	COMPLEATED FLAG	00	Camera Adjustment not completed
		01	Camera adjustment completed
11 ★	ROM VERSION	03	Camera micro processor ver3
0C ★	LENS INITIAL END	00	During the initial operation of the lens
		01	Lens initial operation completed

Addresses with ★ are exclusively for reading.

Table 7-3.

2. Page 1

Address	Adjustment Mode	Data	Function
E6	VH address L		Title horizontal/vertical position (L)
E7	VH address H		Title horizontal/vertical position (H)

Table 7-4.

7-1-7. Adjustment Connector

Most of the measuring points for the camera section adjustment are concentrated on CN701 of the VC-147 board. Connect the oscilloscope and etc. via the measuring pin (J-6082-139-A). The following table lists the terminal numbers and the signal names of CN701.

Terminal Number	Signal Name	Terminal Number	Signal Name
1	D5V	2	NC
3	NC	4	CAM SI
5	NC	6	CAM SO
7	$\overline{\text{CS OPD}}$	8	$\overline{\text{CAM SCK}}$
9	$\overline{\text{CS CORE}}$	10	GND
11	IRIS OUT	12	NC
13	V SUB CHK	14	CAM C
15	PG CONT	16	GND
17	NC	18	CAM Y

Table 7-5.

7-1-8. Data Processing

The calculation of the DDS display and the adjusting remote control unit display data (hexadecimal notation) are required for obtaining the adjustment data of some adjustment items. In this case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Table 7-6. indicates the hexadecimal notation-the decimal notation calculation table.

Hexadecimal notation-Decimal notation

②

The lower digits of the hexadecimal notation / The upper digits of the hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	80	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A (A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
① → B (b)	176	177	178	179	180	180	182	183	184	185	186	187	188	189	190	191
C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Note: ( ) indicate the adjusting remote control unit display.

(Example) In the case that the DDS display and the adjusting remote control unit display are BD (b d).
As the upper digit of the hexadecimal notation is B (b), and the lower digit is D (d), the intersection "189" of the ① and ② in the above table is the decimal notation to be calculated.

Table 7-6.

7-2. CAMERA SYSTEM ADJUSTMENT

1. Power Supply Voltage Check (DD-67 board)

Subject	Option
Measuring instrument	Digital voltmeter
D5V check	
Measurement point	Pins ⑤ and ⑧ of CN901
Specified value	4.92 ± 0.15 Vdc
D4V check	
Measurement point	Pin ④ of CN901
Specified value	3.98 ± 0.15 Vdc
CAM 5V check	
Measurement point	Pins ⑦ and ⑩ of CN901
Specified value	$4.86\ ^{+0.15}_{-0.11}$ Vdc
CAM 15V check	
Measurement point	Pin ⑫ of CN901
Specified value	15.05 ± 0.4 Vdc
CAM –9V check	
Measurement point	Pin ⑨ of CN901
Specified value	–8.5 ± 0.4 Vdc

Checking method:

1) Check that each power supply voltage satisfies the specified value.

2. Page F Data Initialization

Note: It is necessary to perform all adjustments of the camera section from the beginning again if the data of page F has been initialized.

Initializing method:

1) Check that the data of page: 6, address: 09 is 00.
   (Display indicating that page F data can be initialized)
2) Check that the data of page: 6, address: 01 is 00.
3) Set data: 1D to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Page F data initialization execution.
   The data of all addresses of page F will be initialized.)
4) Check that the data of page: 6, address: 09 is 01.
   (Displays that the initialization of page F data has been completed)
5) Set data: 00 to page: 6, address: 01. and press the PAUSE button of the adjusting remote control unit.
   (Releases the page F data initialization mode)
6) After performing "Page F data modification", perform all the adjustments of the camera section (page F).

3. Page F Data Modification

The data (initial data) that is automatically written on page F after the initialization of the page F data will differ according to some camera micro processor versions. Change the data by manual input, and arrange it.

Note: When changing the data, to write the data to the non-volatile memory, press the PAUSE button of the adjusting remote control unit every time the new data is set.

Address	Data
00 (ID)	3D
0A (LOW LIGHT CS)	C0
A2 (FB ZOOM SL)	02
A3 (FB ZOOM SH)	07
B2 (E LOW LIGHT START)	30

[Distinguishing the Camera Micro Computer (IC709) Versions]

Each version can be distinguished by looking at the part name of the camera micro processor or the data of page: 6, address: 11.

Version	Part Name	Page: 6 Address: 11
Ver.3	CXP80624-434R	03

4. 28 MHz Original Oscillation Adjustment (VC-147 board)

Subject	Not required
Measurement Point	Pin ⑰ of IC706 (14 MHz)
Measuring Instrument	Frequency counter
Adjusting Element	CT801
Specified Value	14318181 ± 71 Hz

Adjusting method:

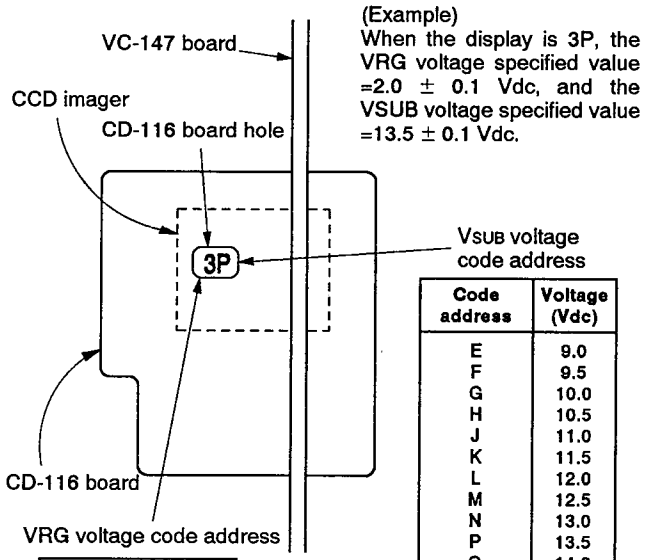
1) Use CT801 to adjust the oscillation frequency to 14318181 ± 71 Hz.

5. V SUB Adjustment (VC-147 board)

Subject	Not required
Measurement Point	Pin ⑬ of CN701 (V SUB CHK)
Measuring Instrument	Digital voltmeter
Adjustment Page	F
Adjustment Address	04 (V SUB)
Specified Value	(Imager display voltage) ± 0.1 Vdc

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Change the data of page: F, address: 04, and adjust the voltage of pin ⑬ of CN701 to (imager display voltage) ± 0.1 Vdc.
3) Press the PAUSE button of the adjusting remote control unit.


VC-147 board
CCD imager
CD-116 board hole
(Example)
When the display is 3P, the VRG voltage specified value =2.0 ± 0.1 Vdc, and the VSUB voltage specified value =13.5 ± 0.1 Vdc.
3P
VSUB voltage code address
CD-116 board
VRG voltage code address

Code address	Voltage (Vdc)
1	1.0
2	1.5
3	2.0
4	2.5
5	3.0
6	3.5
7	4.0

Code address	Voltage (Vdc)
E	9.0
F	9.5
G	10.0
H	10.5
J	11.0
K	11.5
L	12.0
M	12.5
N	13.0
P	13.5
Q	14.0
R	14.5
S	15.0
T	15.5
U	16.0
V	16.5
W	17.0
X	17.5
Y	18.0
Z	18.5

Fig. 7-7.

6. VRG Adjustment (VC-147 board)

Subject	Not required
Measurement Point	Pin ⑮ of CN701 (PG CONT)
Measuring Instrument	Digital voltmeter
Adjustment Page	F
Adjustment Address	05 (VRG)
Specified Value	(Imager display voltage) ± 0.1 Vdc

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Change the data of page: F, address: 05, and adjust the voltage of pin ⑮ of CN701 to (imager display voltage) ± 0.1 Vdc.
3) Press the PAUSE button of the adjusting remote control unit.

7. CCD Imager Correction Data Write

Subject	Not required
Adjustment Page	F
Adjustment	1D to 2C (CCD-DEFECT)

Perform CCD imager correction data write in the following cases.

1. When the CCD imager has been replaced
2. The ocassion of exchaning a camera micro processor or EEPROM (IC712).
3. When the page F data has been initialized

In the case of 1, as the correction data is not required for the CCD imager for repair, adjust all data of addresses 1D to 2C to "00".

In the case of 2 and 3, write the correction data attached to the shield case of VC-147 board to addresses 1D to 2C.

If the correction data are not attached, adjust all data of addresses 1D to 2C to "00".

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Write the correction data to page: F, addresses: 1D to 2C.
   Note: To perform write to the non-volatile memory, press the PAUSE button of the adjusting remote control unit before changing addresses.

Processing after completing adjustments

1) If the CCD imager has been replaced, remove the old correction data label attached on the shield case (UPPER) of VC-147 board.

8. HALL Adjustment

Subject	Not required
Measurement Point	DDS display of EVF or monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	08 (HALL GAIN) 09 (HALL OFFSET)
Specified Value	31 to 35 during IRIS OPEN B1 to B5 during IRIS CLOSE

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Set data: 40 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
   (HALL output display mode setting)
3) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS CLOSE mode setting)
4) Set data: 40 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
5) Read the DDS display data (the bottom two digits of the display data at the bottom right of the EVF or the monitor TV display), and set to W_2.
6) Set data: 30 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
7) Read the DDS display data, and set to W_1.
8) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS OPEN mode setting)
9) Read the DDS display data, and set to K_1.
10) Set data: 40 to page: F, address: 08, and press the PAUSE button.
11) Read the DDS display data, and set to K_2.
12) Convert W_1, W_2, K_1, K_2 to decimal notation, and obtain W_1', W_2', K_1', K_2'. (Refer to Table 7-6. "Hexadecimal notation-decimal notation conversion table".)
13) Calculate X_1' using the following equations (decimal notation calculation).
    $A'=W_2'+K_1'-W_1'-K_2'$ ·····Equation 1
    $B'=W_1'-K_1'$ ·····Equation 2
    $X1'=\frac{2048+(48\times A')-(16\times B')}{A'}$ ·····Equation 3
14) Convert X_1' to hexadecimal notation, and obtain X_1.
    (Round off to one decimal place)
15) Set data: X_1 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
16) Change the data of page: F, address: 09, and adjust the DDS display data to "33".
17) Press the PAUSE button of the adjusting remote control unit.
18) Set data: 03 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
    (IRIS CLOSE mode setting)
19) Read the DDS display data, and set to W_0. If W_0 lies within the "B1" to "B5" range, perform "Processing after completing adjustments". If it lies outside the range, perform the following adjustments.
20) Convert W_0 to hexadecimal notation, and obtain W_0'.
21) Calculate X_2' using the following equations (decimal notation calculation).
    $C'=W_0'-B'-51$ ·····Equation 4
    $X_2'=\frac{(128-B')\times(X_1'-48)+48\times C'}{C'}$ ·····Equation 5
    (X_1' and B' are values obtained from equations 2 and3)
22) Convert X_2' to hexadecimal notation and obtain X_2.
    (Round off to one decimal place)
23) Set data X_2 to page: F, address: 08, and press the PAUSE button of the adjusting remote control unit.
24) Change the data of page: F, address: 09, and adjust the DDS display data to "B3".
25) Press the PAUSE button of the adjusting remote control unit.
26) Set data: 01 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
    (IRIS OPEN mode setting)
27) Check that the DDS display data lies within the "31" to "35" range.

Processing after Completing Adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS NORMAL mode setting)

9. Flange Back Adjustment

Subject	Chart for flange back adjustment (1998 ± 5mm from the front side of the lens Luminance: 300 ± 50 lux)
Measurement Point	Check the operations on the TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	86 (WIDE LIMIT), 87 (WIDE LIMIT H), 88 (TELE LIMIT), 89 (TELE LIMIT H), 8A (STEP ZERO), 8B (STEP ZERO SPAN)

Adjusting method:

1) Turn the auto focus off. (Note 1)
2) Adjust the focus. (Note 1)
3) Check that the flange back adjustment chart center and the exposure display center coincide at both zoom lens TELE end and WIDE end.
4) Release the protect.
   Page: 6, address: 00, data: 01
5) Check that the data of page: 6, address: 09 is 00.
   (Flange back adjustment possible display)
6) Check that the page: F, address: 86 to 8B data is at the initial value. (Refer to Table 7-2. "Page F address list")
7) Set data: 01 to page: F, address: AC.
   (This causes automatic adjustment to be performed. Adjustments are performed at the zoom lens TELE end first, and then at the WIDE end. The adjustment data is automatically input to page: F, addresses: 86 to 8B.)
8) Check that the data of page: 6, address: 09 is 01.
   (Display indicating flange back adjustment completion)

Note 1: Use the adjustment remote control unit.
(HOLD switch: OFF)

Processing after completing adjustments

1) Set data: 00 to page: F, address: AC.
2) Turn off the main power supply (6.3V).

10. Flange Back Check

Subject	Siemens star (2m (or 1.4m) from the front of the lens)
Measurement Point	DDS display of EVF or TV monitor
Measuring Instrument	
Specified Value	$D_2=D_1 \pm 5$

Checking method:

1) Set data: 01 to page: 6, address: 00. (Camera adjustment mode)
2) Set data: B0 to page: F, address: AF. (Focus step display mode)
3) Place the Siemens star 2m (or 1.4m) from the front of the lens.
4) To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appears on the image displayed on the monitor TV screen.
5) Turn off the auto-focus. (Note 1)
6) Shoot the Siemens star with the zoom TELE end.
7) Adjust the focus. (Note 1)
8) Adjust to the zoom WIDE end.
9) Read the focus step value (4 digits) displayed on the TV monitor, and take the value as D_1.
10) Adjust the focus. (Note 1)
    Read the focus step value here, and take the value as D_2.
11) Check that $D_2=D_1 \pm 5$.

Note 1: Use the adjustment remote control unit.
(HOLD switch: OFF)

Process after checking

1) Set data: 00 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.

11. SYNC Level Adjustment (VC-147 board)

Subject	Not required
Measurement Point	Pin ⑱ of CN701 (CAM Y)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	06 (VREF-Y)
Specified Value	A=140 ± 5 mV

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Set data: 05 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS CLOSE mode setting)
3) Change the data of page: F, address: 06, and adjust so that the SYNC level (A) becomes the specified value.
4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Release of IRIS CLOSE mode)

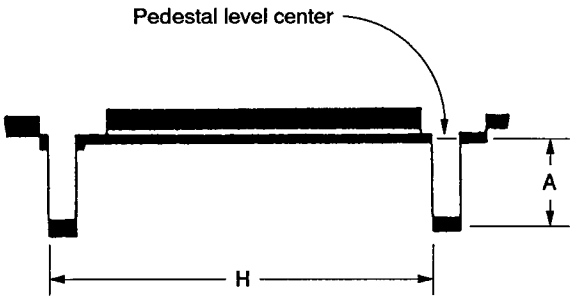


Fig. 7-8.

12. BURST Level Adjustment (VC-147 board)

Subject	Not required
Measurement Point	Pin ⑭ of CN701 (CAM C)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	07 (VREF-C)
Specified Value	A=140 ± 5 mVp-p

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Set data: 05 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS CLOSE mode setting)
3) Change the data of page: F, address: 07, and adjust so that the burst level (A) becomes the specified value.
4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Release of IRIS CLOSE mode)

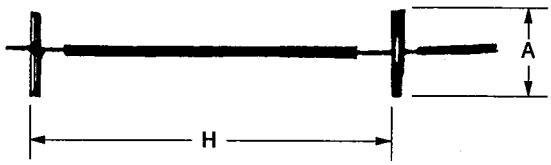


Fig. 7-9.

13. A/D Offset Adjustment

Subject	Not required
Measurement Point	DDS display on the EVF or the TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	0C (AD REF)
Specified Value	46 to 47

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Set data: 05 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS CLOSE AGC MIN mode setting)
3) Set data: 00 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
   (Y sampling output mode setting)
4) Set data: 35 to page: 1, address: E6.
   (Setting 1 of the sampling position)
5) Set data: 6D to page: 1, address: E7.
   (Setting 2 of the sampling position)
6) Change the data of page: F, address: 0C, and adjust the average value of the DDS display (the bottom two digits of the display data at the bottom right of the EVF or the TV monitor display) to 46 to 47.
   (Set the data of address 0C to the maximum value satisfying the specification.)
7) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Turn the main power supply (6.3V) off.

14. Carrier Balance Adjustment

Subject	Not required
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	03 (CS SL)
Specified Value	The center of the black luminance point should lie within the 1 ϕ circle whose center is the principle point.

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01.
2) Set data: 07 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS CLOSE, AGC MAX mode setting)
3) Change the data of page: F, address: 03, and adjust so that the center of the black luminance point coincides with the principle point.
4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (IRIS NORMAL mode setting)

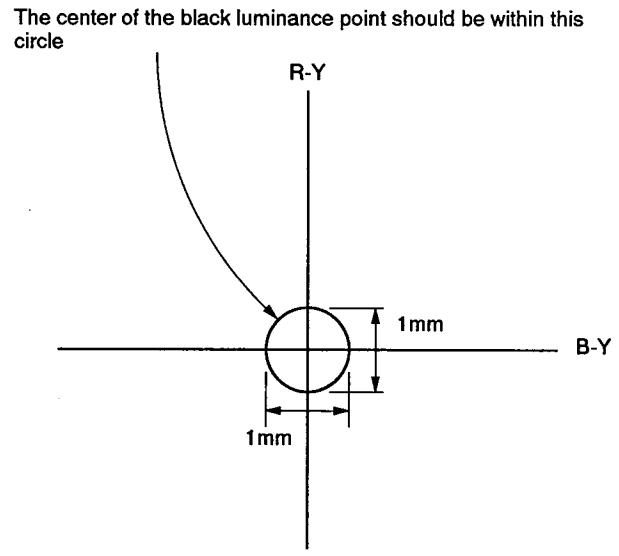


Fig. 7-10.

15. Picture Frame Setting

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Oscilloscope and TV monitor.
Specified Value	A=B, C=D, t=0 ± 0.1 msec

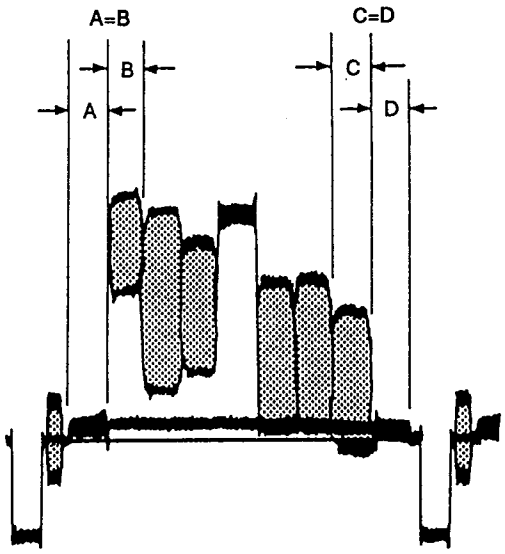
Setting method:

1) Turn the auto focus off. (Note 1)
2) Adjust the focus. (Note 1)
3) Adjust the zoom and the camera direction, and set to the specified position.
4) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "color bar chart standard picture frame".

Note 1: Use the adjustment remote control unit.
(HOLD switch: OFF)

Check on the oscilloscope

1. horizontal period



2. Vertical period

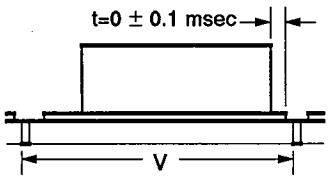


Fig. 7-11.

Check on the TV monitor

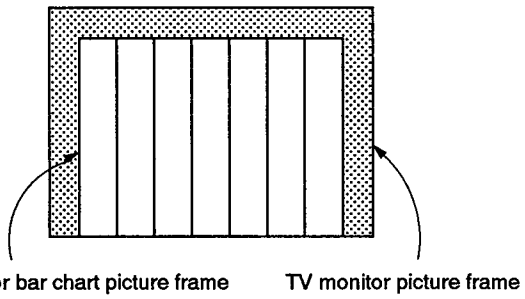


Fig. 7-12.

16. IRIS Level Adjustment (VC-147 board)

Subject	Color bar standard picture frame
Measurement Point	Pin ⑪ of CN701 (IRIS OUT)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	63 (AGC MIN)
Specified Value	A=200 ± 5 mV

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Change the data of page: F, address: 63, and adjust so that the IRIS OUT signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.

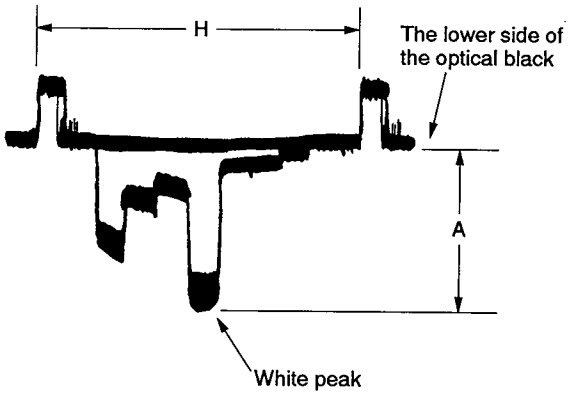


Fig. 7-13.

17. MAX GAIN Adjustment (VC-147 board)

Subject	Color bar standard picture frame
Filter	ND filter 1.0 (2 sheets) and 0.4 (1 sheet), 0.1 (1 sheet)
Measurement Point	Pin ⑱ of CN701 (CAM Y)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	64 (AE MIN L)
Specified Value	A=260 ± 5 mV

Adjusting method:

1) Place the ND filter 2.5 (1.0+1.0+0.4+0.1) on the lens.
2) Release the protect.
   Page: 6, address: 00, data: 01
2) Change the data of page: F, address: 64, and adjust so that the CAM Y signal level (A) becomes the specified value.
4) Press the PAUSE button of the adjusting remote control unit.

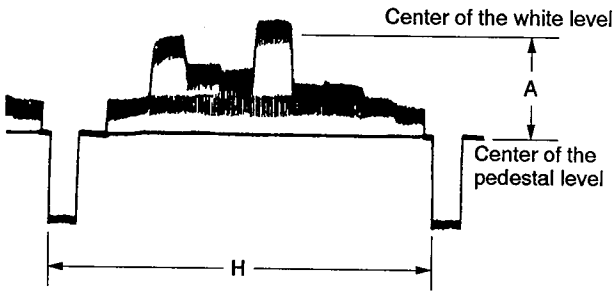


Fig. 7-14.

18. IRIS IN/OUT Adjustment

Subject	White pattern standard picture frame
Measurement Point	DDS display of the EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	39 (AWB IRIS IN) 3A (AWB IRIS OUT)

Adjusting method:

1) Set data: 11 to page: 6, address: 00.
   (Camera adjustment mode 2 setting)
2) Set data: 40 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
   (HALL data display)
3) Set data: 0B to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (ND0.8 shutter mode setting)
4) Read the DDS display data (the bottom two digits of the display data at the bottom right of the EVF or the TV monitor), and set to D39.
5) Set data: D39 to page: F, address: 39, and press the PAUSE button of the adjusting remote control unit.
6) Set data: 09 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (ND0.5 shutter mode setting)
7) Read the DDS display data and set to D3A.
8) Set data: D3A to page: F, address: 3A, and press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Release of the ND0.5 shutter mode)

19. Pre-white Balance Adjustment

Subject	White pattern standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	33 (R CONT REF), 34 (B CONT REF)
Specified Value	The center of the white luminance point should lie within the circle with a diameter of 1mm and whose center is the principle point

Adjusting method:

1) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (WB 3200K preset mode setting)
2) Set data: 11 to page: 6, address: 00.
   (Camera adjustment mode 2 setting)
3) Change the data of addresses:33 and 34 of page: F alternately, and coincide the white luminance point to the principle point.
   Note: Be sure to press the PAUSE button of the adjusting remote control unit before changing the addresses. If not, the new data will not written to the memory.
4) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Release of the preset mode)
2) Set data: 10 to page: 6, address: 00.
   (Protect mode setting)

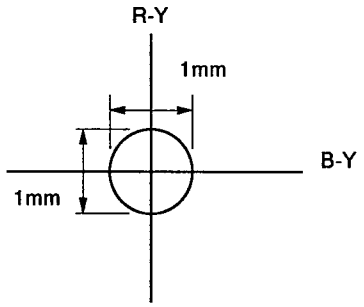


Fig. 7-15.

20. Color Reproduction Adjustment

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	18 (CORE B–Y GAIN), 19 (CORE R–Y GAIN), 1A (CORE R–Y HUE), 1B (CORE B–Y HUE)
Specified Value	All color luminance points should settle within each color reproduction frame.

Adjusting method:

1) Release the protect.
   Page: 6, address: 00, data: 01
2) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Indoor white balance mode setting)
3) Adjust the GAIN and PHASE of the vectorscope, and adjust the burst luminance point to the burst position of the color reproduction frame.
4) Change the data of addresses 18 to 1B of page: F, and settle each color luminance point in each color reproduction frame.
   Note: Be sure to press the PAUSE button of the adjusting remote control unit before changing the addresses. If not, the new data will not be written to the memory.
5) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01 and press the PAUSE button of the adjustment remote control unit.
   (Release of the adjustment mode)
2) Set data: 10 to page: 6, address: 00.
   (Protect mode setting)

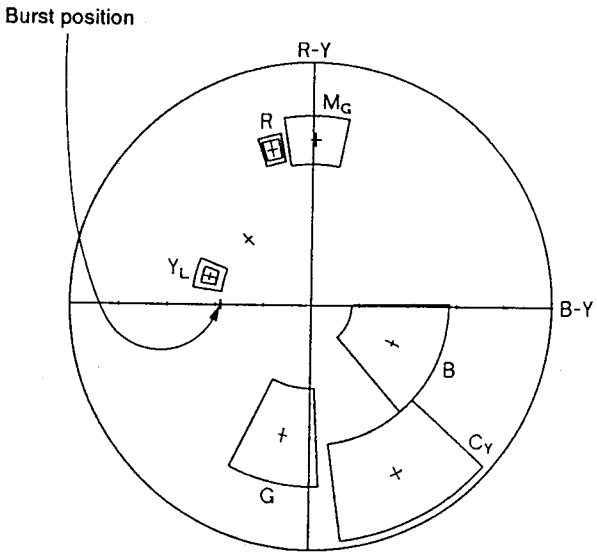


Fig. 7-16.

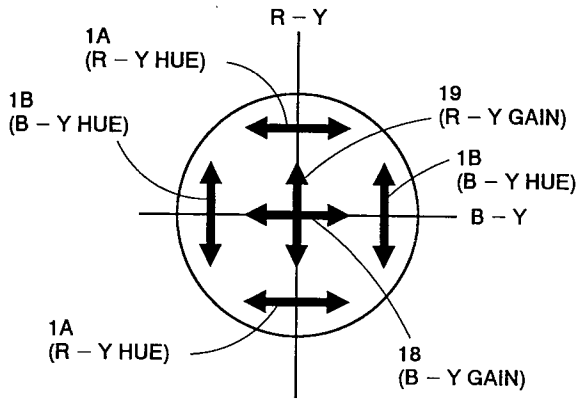


Fig. 7-17. Direction of the Movements of the Adjustment Address and Luminance Point

21. Auto White Balance Preset Adjustment

Subject	White pattern standard picture frame
Adjustment Page	F
Adjustment Address	2D (R REF L), 2E (R REF H), 2F (G REF L), 30 (G REF H), 31 (B REF L), 32 (B REF H)

Adjusting method:

1) Turn the power of the unit OFF/ON.
2) Check that the data of page: 6, address: 09 is 00.
   (Auto white balance preset adjustment possible display)
3) Set data: 11 to page: 6, address: 00, and wait at least 2 seconds.
   (Camera adjustment mode 2 setting)
5) Set data: 11 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (3200K preset data take in preparation mode)
6) Set data: 0D to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (When the 3200K preset data is taken in, the data will be automatically input to addresses 2D to 32 of page F.)
7) Check that the data of page: 6, address: 09 is 01.
   (Auto white balance preset adjustment completion display)

Processing after completing adjustments

1) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Release of the auto white balance preset mode)
2) Set data: 10 to page: 6, address: 00.
   (Release of camera adjustment mode 2)

22. Auto White Balance Adjustment

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction
Measurement Point	Check with the DDS display on the EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	35 (AWB NORM R) 36 (AWB NORM B)
Specified Value	R ratio 2A80 ± 40 B ratio 5A80 ± 40

Note: Check that "Auto White Balance Preset Adjustment" have been completed.

Adjusting method:

1) Place the C14 filter for color temperature correction on the lens.
2) Set data: 11 to page: 6, address: 00.
   (Camera adjustment mode 2 setting)
3) Set data: D0 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
   (Auto white balance adjustment mode setting)
4) Set data: 82 to page: F, address: AF.
   (R ratio display mode setting)
5) Change the data of page: F, address: 35, and adjust the average value of the DDS display data (the display data at the bottom right of the EVF or the TV monitor) to 2A80 ± 40.
6) Press the PAUSE button of the adjusting remote control unit.
7) Set data: 83 to page: F, address: AF.
   (B ratio display mode setting)
8) Change the data of page: F, address: 36, and adjust the average value of the DDS display data to 5A80 ± 40.
9) Press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
   (Release of the white balance adjustment mode)
2) Set data: 10 to page: 6, address: 00.
   (Release of camera adjustment mode 2)

23. White Balance Check

Subject	White pattern standard picture frame
Filter	Filter C14 for color temperature correction ND filter 1.0 and 0.3
Measurement Point	Video output terminal
Measuring Instrument	Vectorscope
Specified Value	Fig. 7-18. A to C

Checking method:

1) Check that the lens is not covered with either filter.
2) Set data: 11 to page: 6, address: 00.
   (Camera adjustment mode 2 setting)
3) Set data: 0F to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Indoor white balance mode setting)
4) Check that the center of the white luminance point is within the circle shown in Fig. 7-18.A.
   (Indoor white balance check)
5) Set data: 00 to page: 6, address: 01, and press the PAUSE button of the adjusting remote control unit.
   (Auto white balance mode setting)
6) Set data: 01 to page: F, address: 5C, and press the PAUSE button of the adjusting remote control unit.
   (Auto white balance high speed tracking mode setting)
7) Set data: 91 to page: F, address: AF (R, B ratio (M) display mode setting), and check that the top 2 digits and bottom 2 digits of the DDS display are 3D to 43. Or check that the center of the white luminance point is within the circle shown in Fig. 7-18. A.
8) Place the C14 filter on the lens.
9) Check that the center of the white luminance point settles in the circle shown in Fig. 7-18. B.
   (Auto white balance outdoor mode check)
10) Remove the C14 filter, and place the ND filter 1.3 (1.0+0.3) on the lens.
11) Check that the center of the white luminance point settles in the circle shown in Fig. 7-18. C.
    (Auto white balance outdoor mode check)

Processing after completing adjustments

1) Set data: 10 to page: F, address: 5C, and press the PAUSE button of the adjusting remote control unit.
   (Release of the auto white balance fast tracking mode)
2) Set data: 10 to page: 6, address: 00.
   (Release of camera adjustment mode 2)
3) Set data: 00 to page: 6, address: 01, and press the PAUSE button.

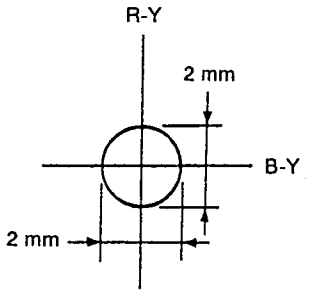


Fig. 7-18. A

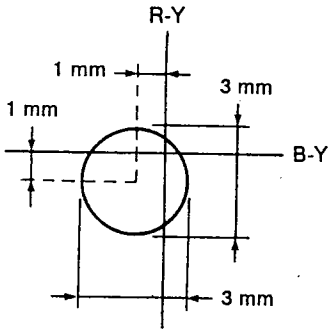


Fig. 7-18. B

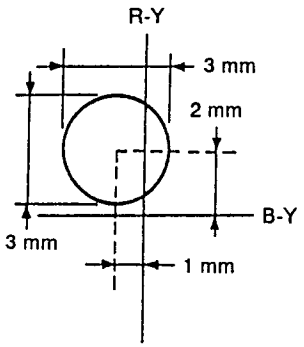


Fig. 7-18. C

24. Linear Matrix Adjustment

Subject	Color bar standard picture frame
Filter	Filter C14 for color temperature correction
Measurement Point	DDS display on the EVF or TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	3D (DMAT HUE) 3E (DMAT GAIN)

Note 1: Check that position that was set in the color bar chart picture frame "15. Picture Frame Setting" is maintained, before beginning adjustments.

Adjusting method:

1) Remove the filter C14 for color temperature correction.
2) Release the protect.
   Page: 6, address: 00, data: 01
3) Color bar data sampling mode setting
   1. Set data: F1 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
   2. Set data: 2E to page: F, address: 14, and press the PAUSE button of the adjusting remote control unit.

   (Check that the colors on the monitor display at the color modulation stop mode have disappeared)
4) Specifying the Yellow position
   1. Set data: C9 to page: 1, address: E6.
   2. Set data: B6 to page: 1, address: E7.
5) Set data: 02 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
   (R–Y data display mode setting)
6) Read the average value of the DDS display data (Note 2), and set to Y_1.
7) Specifying the Red position
   1. Set data: 59 to page: 1, address: E6.
   2. Set data: 6D to page: 1, address: E7.
8) Select page: F and read the average value of the DDS display data (Note 2), and set to R_1.
9) Place the filter C14 for color temperature correction on the lens. (Ensure that the picture frame of the chart does not shift at this time.)
10) Specifying the yellow position.
    1. Set data: C9 to page: 1, address: E6.
    2. Set data: B6 to page: 1, address: E7.
11) Select page: F and read the average value of the DDS display data (Note 2), and set to Y_2.
12) Specifying the Red position
    1. Set data: 59 to page: 1, address: E6.
    2. Set data: 6D to page: 1, address: E7.
13) Select page: F and read the average value of the DDS display data (Note 2), and set to R_2.
14) Convert Y_1, R_1, Y_2, R_2 to decimal notation to obtain Y_1', R_1', Y_2' and R_2'.
    (Refer to Table 7-6. "Hexadecimal notation-decimal notation conversion table")
15) Calculate X_1' from the following equation (decimal notation calculation).
    $X_1'=Y_2'-Y_1'$
16) Calculate D_{3D} from the following table
    (D_{3D} is hexadecimal notation)

X_1' value	D_{3D}
$-1 \leqq X_1' \leqq 1$	F0
$X_1'>1$	F1
$X_1'<-1$	FF

17) Set data: D_{3D} to page: F, address: 3D, and press the PAUSE button of the adjusting remote control unit.
18) Calculate X_2' from the following equation (decimal notation calculation).
    $X_2'=R_2'-R_1'$
19) Calculate D_{3E} from the following table.

X_2' value	D_{3E}
$X_2' \geqq 0$	00
$0>X_2' \geqq -1$	01
$-1>X_2'$	02

20) Set data: D_{3E} to page: F, address: 3E, and press the PAUSE button of the adjusting remote control unit.

Processing after completing adjustments

1) Set data: 00 to page: F, address: 60, and press the PAUSE button of the adjusting remote control unit.
   (Release of the sampling mode)
2) Set data: 2C to page: F, address: 14, and press the PAUSE button of the adjusting remote control unit.
   (Color modulation ON mode setting)
3) Set data: 00 to page: F, address: AF, and press the PAUSE button of the adjusting remote control unit.
   (Release of the R–Y data display mode)
4) Turn the main power supply (6.3V) off.

Note 2: The right two digits of the display data at the bottom right of the EVF or monitor TV. The R–Y data is above 80. When the DDS display data is below 80, set data: 01 to page F, address: AF and press the PAUSE button of the adjusting remote control unit.

25. VIDEO OUT Level Check

Subject	Color bar chart standard picture frame
Measurement Point	Video output terminal (Terminated at 75 Ω)
Measuring Instrument	Oscilloscope
Specified Value	Y level=680 ± 40 mV SYNC level=285 ± 20 mV BURST level=280 ± 30 mVp-p

Checking method:

1) Check that the Y level, SYNC level and BURST level satisfy the specified values.

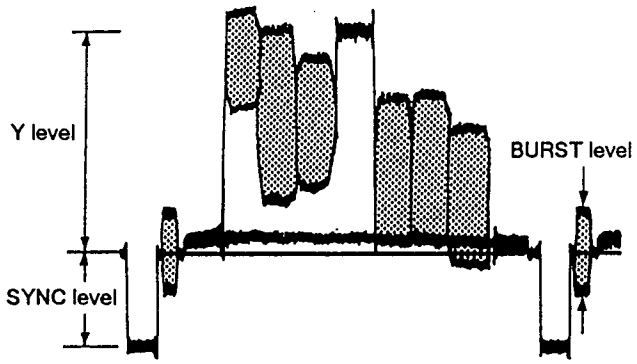


Fig. 7-19.

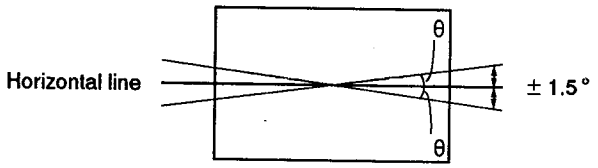
7-3. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENTS

7-3-1. Horizontal Slant Adjustment

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Specified Value	Refer to Fig. 7-21.

Adjusting method:

1) Adjust RV504 (BRIGHT) so that the CRT can be seen easily and clearly.
2) Loosen the DY (deflection yoke) tightening nut.
3) Rotate DY, and adjust the image so that it is horizontal.
4) Tighten the DY tightening nut.
   (Do not tighten it too tightly.)



Specified value: The image should be within ± 1.5° of the horizontal line.

Fig. 7-21.

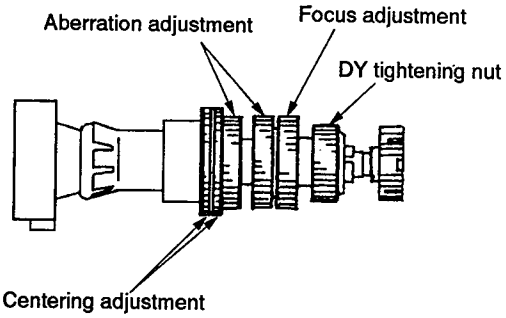


Fig. 7-22.

7-3-2. Centering Adjustment

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Specified Value	Refer to Fig. 7-23.

Adjusting method:

1) Use the centering adjustment ring and adjust so that the left, right, top, and bottom sides of the display are uniform. (Refer to Fig. 7-22.)

   Note: As the centering position changes due to earth magnetism, rotate it 360 ° in the horizontal direction, and adjust with the center section of the modifying position.

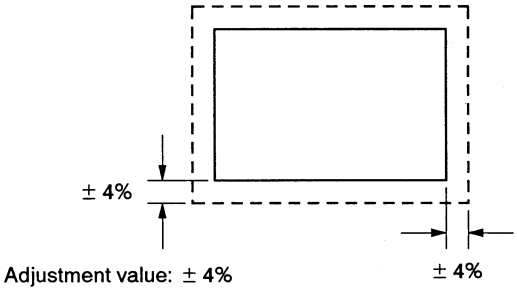


Fig. 7-23.

7-3-3. Focus Adjustment

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section

Adjusting method:

1) Adjust the focus ring to obtain the optimum focus. (Refer to Fig. 7-22.)

7-3-4. Aberration Adjustment

Model	E-E
Signal	Dot pattern
Specified Value	Refer to Fig. 7-24.

Adjusting method:

1) Adjust the aberration adjustment ring so that the tracing of the dot becomes less than twice the diameter of the dot, or the fan aberration becomes less than the diameter of the dot.
2) If the centering becomes displaced here, perform the centering adjustment from the beginning again.

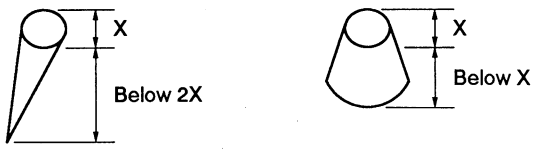


Fig. 7-24.

7-3-5. Horizontal Oscillation Frequency Adjustment (VF-42 board)

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP)
Measurement Point	Positive pole terminal of C516
Measuring Instrument	Digital voltmeter or oscilloscope (DC range)
Adjustment Element	RV501
Specified Value	2.60 ± 0.05 Vdc

Adjusting method:

1) Adjust to 2.60 ± 0.05 Vdc using RV501.

7-3-6. Horizontal Amplitude Adjustment (VF-42 board)

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Adjusting Element	C504
Specified Value	6 ± 2%

Adjusting method:

1) Rotate RV502, and adjust the top and bottom sides of the monoscope image to the top and bottom edges of the display.
2) Rotate RV504 so that the brightness is the normal level.
3) Adjust the pattern (A) of the H size adjustment capacitor (C504) to "short" or "open", so that the horizontal direction over scan becomes 6 ± 2% (Left and right totals). (Refer to Fig. 7-26.)

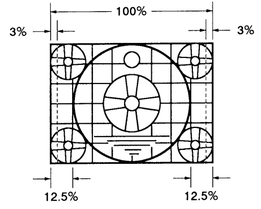
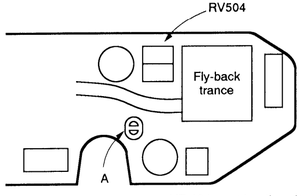


Fig. 7-25.



VF-42 board (section side)

Section A	Size H
Open	Small
Short	Big

Fig. 7-26.

7-3-7. Vertical Amplitude Adjustment (VF-42 board)

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Adjusting Element	RV502
Specified Value	5 ± 2%

Adjusting method:

1) Adjust RV502 so that the vertical direction over scan becomes 5 ± 2% (Top and bottom totals).

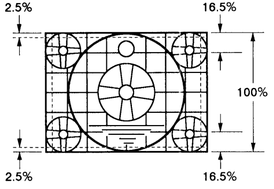


Fig. 7-27.

7-3-8. Brightness, Contrast Adjustments (VF-42 board)

Model	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Monoscope section
Adjusting Element	Brightness: RV504 Contrast: RV503

Adjusting method:

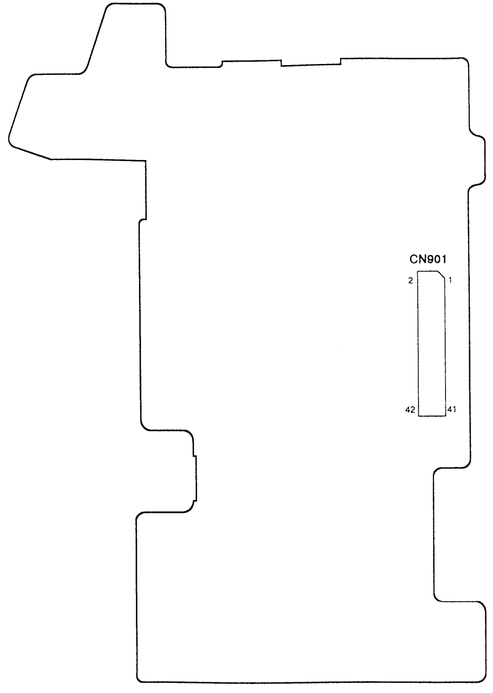
1) Rotate RV504 and RV503 alternately, and adjust so that the bright/dark sections of the gray scale are displayed correctly. (The bright section should be unsatisfactory till the cross hatch appears vague in the monoscope circle. The dark section should be unsatisfactory till the darkest section and the second darkest section of the gray scale cannot be differentiated.)

7-3-9. Horizontal Amplitude, Vertical Amplitude, Focus Check

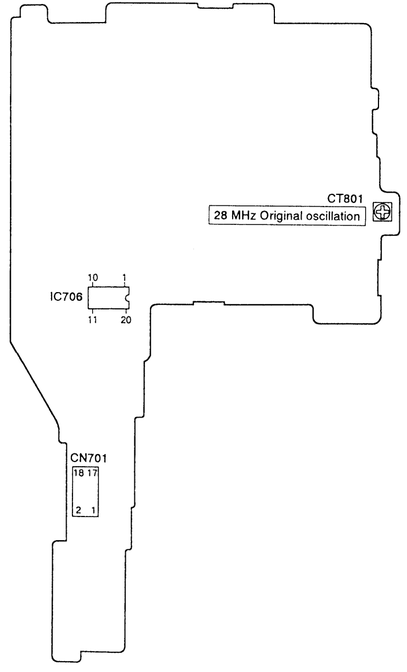
"7-3-6. Horizontal Amplitude Adjustment" and "7-3-7. Vertical Amplitude Adjustment" should both satisfy the specified values. If not, perform the adjustments from the beginning again. In this case, perform [7-3-8. Brightness, Contrast Adjustments] again. Moreover, check the focus, and if it found to be vague, perform "7-3-3. Focus Adjustment" and "7-3-4. Aberration Adjustment".

7-4. ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

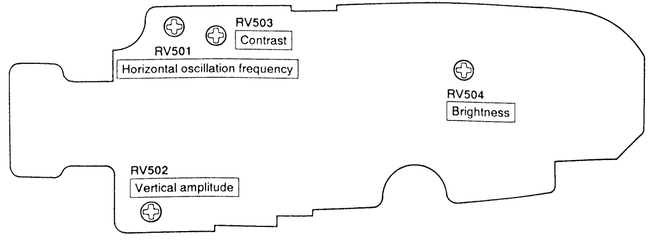
DD-67 BOARD (COMPONENT SIDE)



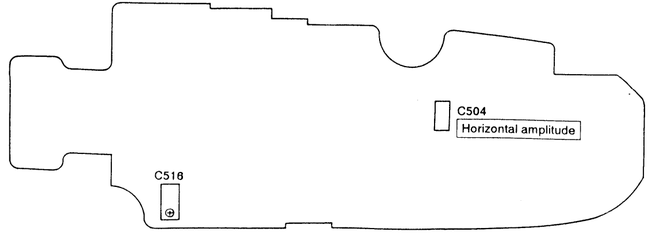
VC-147 BOARD (CONDUCTOR SIDE)



VF-42 BOARD (COMPONENT SIDE)



VF-42 BOARD (CONDUCTOR SIDE)



SECTION 8
MECHANICAL SECTION ADJUSTMENTS

For Mechanical Adjustments

Refer to the separate volume of mechanical adjustment "8 mm Video MECHANICAL ADJUSTMENT MANUAL IV (A Mechanism)" for the adjustments and checks of mechanism section and the mechanical parts replacement. (9-973-199-11)
For setting of the track shift mode, however, refer to the following.

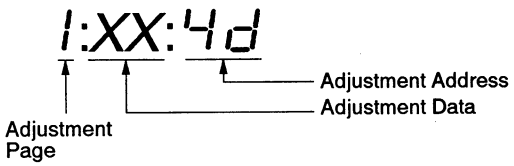
8-1. SETTING THE TRACK SHIFT MODE

Note: Camera part and video part should have been installed.

[Setting Method]

1) Set the adjustment commander to the HOLD ON side.
2) Set page: 1, address: 01 and data: 01, and then release the protector.
3) Set page: D and address: 01.
4) Set adjustment data to 03 (test mode 3) by PLAY or STOP button.

   (When HOLD OFF once after the setting and HOLD ON again, the display of the address data will be changed. To set the another mode with shifting, repeat the procedures from 3).
5) Set to the HOLD OFF side in order to set the normal mode.



8-2. PREPARATION FOR ADJUSTMENT

1) Clean the tape running surfaces (tape guides, drum, capstan shaft, pinch roller.)
2) Connect to the oscilloscope.
   CH1: VS-116 board CN002 pin ③ (PB RF)
   CH2: VS-116 board CN002 pin ④ (SWP)
3) Play back the tracking alignment tape (WR5-1NP: 8-967-995-02).
4) Check that the RF waveform of the oscilloscope is flat at both inlet and outlet sides. If not flat, make adjustment as follows. (Refer to Fig. 8-1 and 8-2)

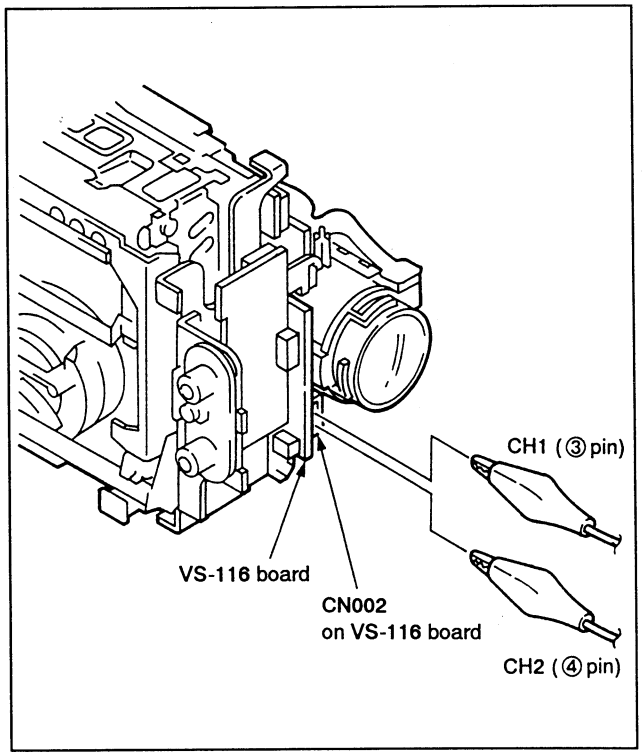


Fig.8-1.

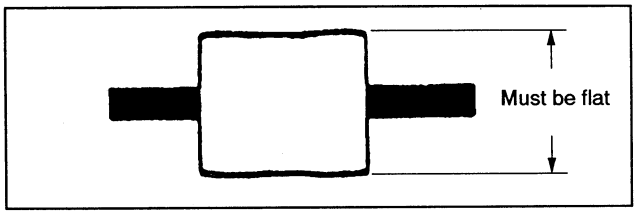


Fig.8-2.

SECTION 9
VIDEO SECTION ADJUSTMENTS

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 226.

9-1. PREPARATIONS BEFORE ADJUSTMENT

The following adjusting instruments are used for adjusting the video section.

9-1-1. Equipments to be used

1) TV monitor
2) Oscilloscope: 2 phenomena, band 30 MHz or wider, with delay mode. (Use a 10:1 probe unless specified otherwise.)
3) Frequeney counter
4) Pattern generator with video output terminal
5) Digital voltmeter
6) Audio generator
7) Audio level meter
8) Audio distortion meter
9) Audio attenuater
10) Regulated power supply
11) Alignment tape
    For tracking adjustment (WR5-1NP)
    Part Code: 8-967-995-02
    For video frequency characteristics adjustment (WR5-6N)
    Part Code: 8-967-995-12
    For checking operations (WR5-4NL)[Note 1]
    Part Code: 8-967-995-51
    (WR5-5NSP)[Note 2]
    Part Code: 8-967-995-42
    Note: The following alignment tapes can also be used.
    1) WR5-3NL (8-967-995-31)
    2) WR5-4NSP (8-967-995-41)
12) Remote control unit for adjustment (J-6082-053-B)
13) DD-67 board extension cord (42P, 0.8 mm)
    Part Code: J-6082-195-A
14) AU-171 board, Cabinet (R) extension cord (20P, 0.8 mm)
    Part Code: J-6082-196-A
15) Mecha deck extension cord (30P, 0.8 mm)
    Part Code: J-6082-167-A

9-1-2. Connecting the equipments

Unless specified otherwise, connect the measuring instruments as shown in Fig. 9-1 and perform the adjustments.

- Camera/player power switch ·····Position of the player
- Connect the adjusting remote control unit to the remote terminal (DD-67 board CN902).

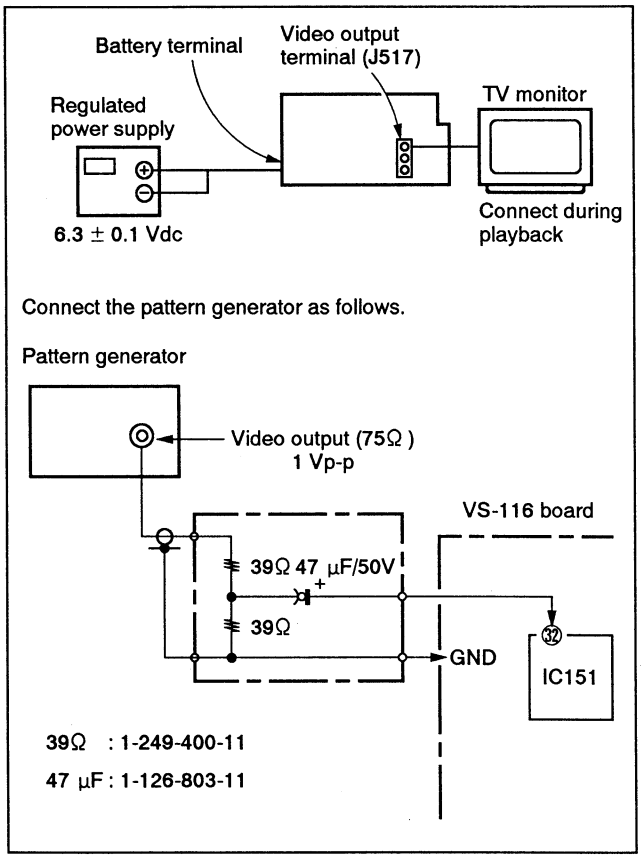


Fig. 9-1.

9-1-3. How to Set the REC Mode

1. REC key forbidden accept mode cancel
   1. Connect the adjustment remote controller to the REMOTE terminal.
   2. Turn on the power.
   3. Turn on the HOLD switch of the adjustment remote controller.
   4. Select the page: 1 address: 00, and set the data to 01. (Protect mode cancel)
   5. Select the page: D address: 02, and set the data to 4B [6B].[Note 1] (REC key forbidden accept mode cancel)
   6. Press PAUSE button on the adjustment remote controller. (Write to the non-volatile memory)

The REC key is accepted through the above procedure.

2. REC mode setting
   1. Connect the collector of Q200 on the VS-116 board and GND with a jumper wire. (CCD delay (IC154) active mode setting)
   2. Turn on the HOLD switch of the adjustment remote controller.
   3. Select the page: 1 address: A3, and set data to 01.
   4. Select the page: 1 address: 0B, and set data to C8. (Line input mode setting)
   5. Turn off the HOLD switch of the adjustment remote controller.
   6. Press REC buttons of the adjustment remote controller.
   7. Remove the jumper wire and perform "3. Procedure after completed the adjustment", after completing adjustment.

3. Procedure after completed the adjustment
   Be sure to return the mode to REC key forbidden accept mode after adjustment.
   1. Connect the adjustment remoter controller to the REMOTE terminal.
   2. Turn on the power.
   3. Turn on HOLD switch of the adjustment remote controller.
   4. Select the page: 1 address: 00, and set the data to 01. (Protect mode cancel)
   5. Select the page: D address: 02, and set the data to 4A [6A].[Note 1] (Setting of the REC key forbidden accept mode)
   6. Press PAUSE button on the adjustment remote controller. (Write to the non-volatile memory)

Note 1: No mark : CCD-TR28/TR30
[ ] : CCD-TR350/TR350PK

9-1-4. Precautions upon adjustment

The EVF (Electronic viewfinder) is not required for adjusting the video section.
Remove the following connector when removing the EVF section.

1. VS-116 board CN102 (6 PIN)

The front panel section assembly is required for adjusting the video section. Remove the following connectors when removing the front panel section assembly.

1. AU-171 board CN601 (5 PIN)

The cabinet (R) is required for adjusting the video section. Use the extension cord (J-6082-196-A) when adjusting the video section.

9-1-5. Set-up during Adjustment

As the video signal obtained from the pattern generator is used as an adjustment signal during electric adjustments, ensure that this video output signal is within the specification. Connect the oscilloscope to pin ㉜ of IC151 on the VS-116 board, and check that the amplitude of the sync signal of the video signal is approximately 0.15V, the amplitude of the video section is approximately 0.35V, the amplitude of the burst signal is approximately 0.15V and flat, and that the level ratio of the burst signal and the [red] signal is 0.30: 0.66. The video signal (color bar) used for electric adjustments is shown in Fig. 9-2.

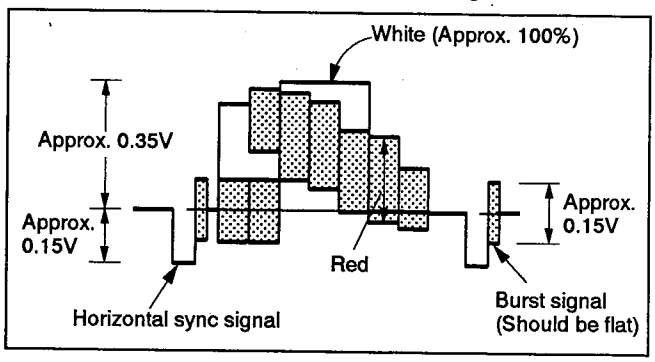


Fig. 9-2. Color Bar Signal of the Pattern Generator

9-1-6. Alignment Tape

The following table lists alignment tapes which are available.
Use the tape specified in the signal column for each adjustment.

If the type of tape to be used for checking operations is not specified, use whichever type.

Name	Record -ing mode	Tape type	Tape speed	Recording contents		Usage
				Video area	PCM area	
Tracking WR5-1NP	L	MP	SP	CH2: Signal for 1 MHz tape path adjustment		Tape path adjustment Switching position adjustment
Video frequency characteristics WR5-6N	L	MP	SP	RF sweep 0 to 10 MHz Marker 1, 3.58, 5.5, 7 MHz		Frequency characteristics adjustment
Operation check (SP mode) WR5-5NSP	L	MP	SP	• Video signal Color bar 4 minutes Monoscope 4 minutes • Audio signal (AFM) 400 Hz 60% modulation	• Audio signal (PCM) Monoscope section 20 Hz 20 sec. / 400 Hz 20 sec. / 14 kHz 20 sec. } Color bar section Repeated 4 times 1 kHz 4 minutes	Checking operations
Operation check (LP mode) WR5-4NL	L	MP	LP	• Video signal Color bar 4 minutes Monoscope 4 minutes • Audio signal (AFM) 400 Hz 60% modulation		

Note: Recording mode
L ..... Conventional mode
E ..... hi8 (hi band) mode

Tape type
MP ..... Particle type metal tape
ME ..... Evaporated type metal tape

Table 9-1.

Fig. 9-3. shows the 75% color bar signals recorded on the alignment tape.

Note: Measure using the video input/output terminal (Terminated at 75 Ω)

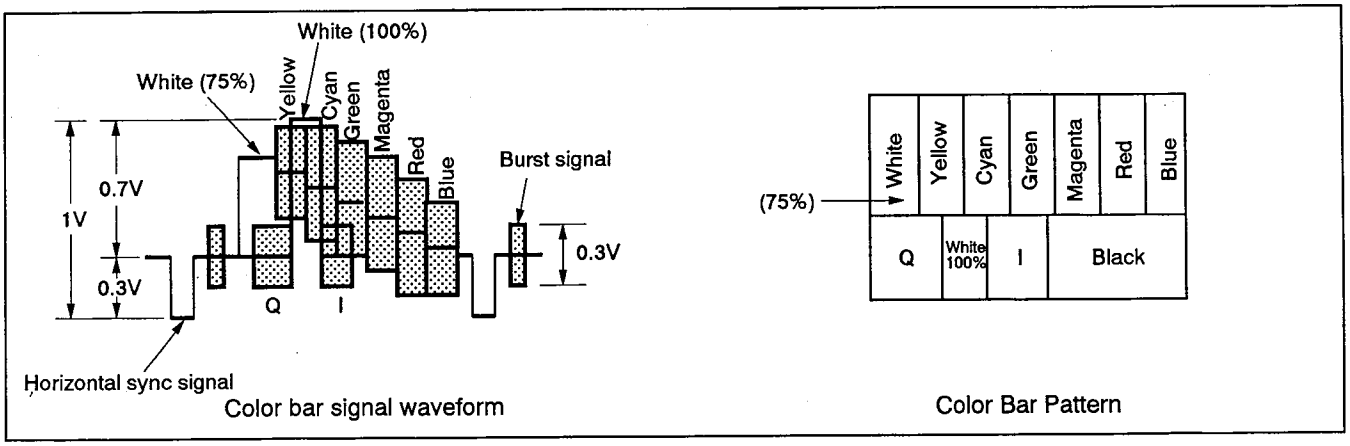


Fig. 9-3. Color Bar Signals of the Alignment Tape

9-1-7. Output Level and Impedance

Video output	Phono jack, 1 Vp-p, 75Ω unbalanced, sync negative
Audio output	Phono jacks –7.5 dBs (at load impedance 47 kΩ) impedance less than 2.2 kΩ

9-1-8. Service Mode

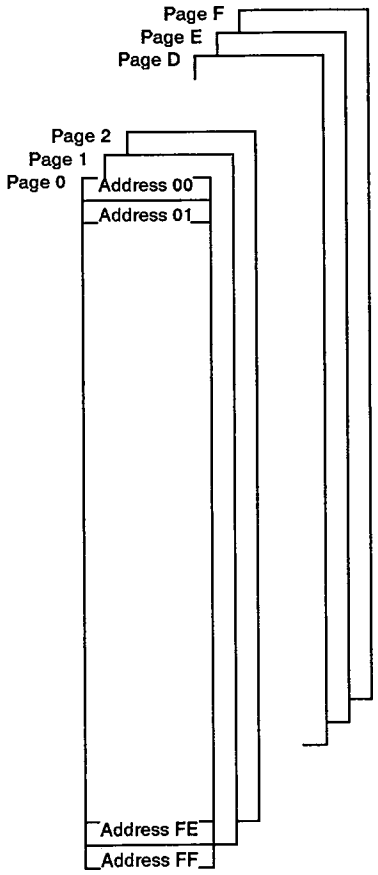
1. Setting the Service mode

The service mode consists of the adjustment mode which adjusts the EVR and the test mode which displays the condition of the unit.

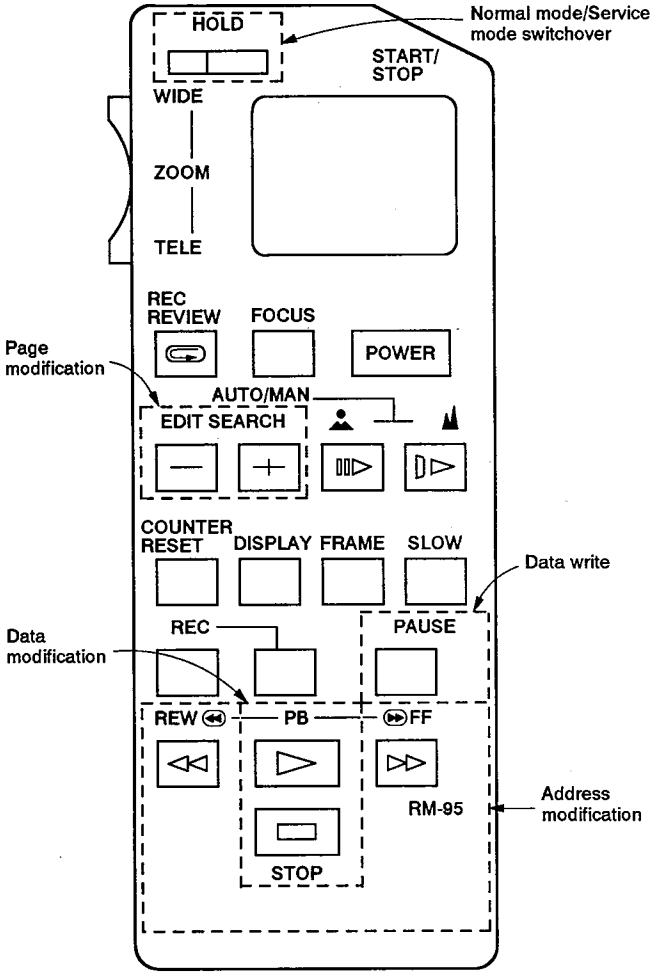
The unit can be shifted into the test mode and adjustment mode by connecting the adjusting remote control unit (set the HOLD switch to the HOLD side).

Adjusting Remote Control Unit LCD Display

(1) Service LANC memory map

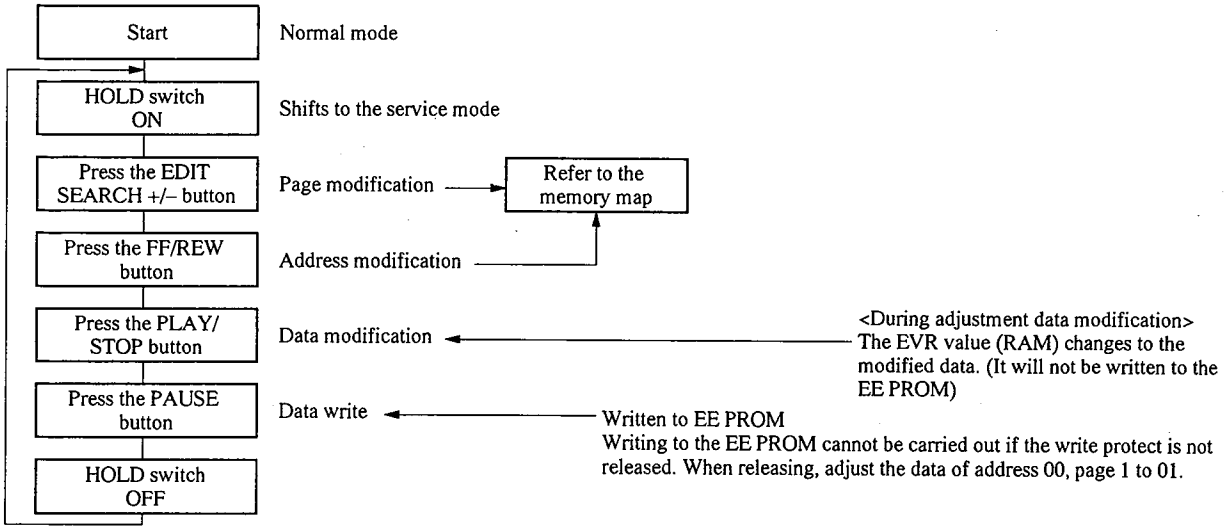


Adjusting remote control unit RM-95 (J-6082-053-B)



Page	Page allocation	Description
0	Not used	
1	Mode Control RAM, I/O	RAM and I/O interface data memory area required for operating the mode controller. Data is not held when the power is turned off because this area is not ROM.
2~4	Mechanical Control RAM, I/O	RAM and I/O memory area of the mechanical controller.
5	Not used	
6~8	Camera Control RAM, I/O	RAM and I/O memory area of the camera control.
9	Not used	
A	Camera Control RAM, I/O	RAM and I/O memory area of the camera control.
B, C	Not used	
D	VTR EE-PROM	ROM memory area of the VTR part. Data of this area is held by EE-PROM when the power is turned off. Releasing protect is required for changing data.
E	Not used	
F	Camera EE-PROM	ROM memory area of the camera part. Data of this area is held by EE•P•ROM when the power is turned off.

(2) Shifting to the Service Mode Using the Adjusting Remote Control Unit


Start
Normal mode
HOLD switch ON
Shifts to the service mode
Press the EDIT SEARCH +/– button
Page modification
Refer to the memory map
Press the FF/REW button
Address modification
Press the PLAY/ STOP button
Data modification
<During adjustment data modification>
The EVR value (RAM) changes to the modified data. (It will not be written to the EE PROM)
Press the PAUSE button
Data write
Written to EE PROM
Writing to the EE PROM cannot be carried out if the write protect is not released. When releasing, adjust the data of address 00, page 1 to 01.
HOLD switch OFF

Command Name	Command Function	Normal LANC command
Page Up	Page +1	Edit Search +
Page Down	Page –1	Edit Search –
Direc Page Set	Sets the specified page	Event Clear
Address Up	Address +1	Fast Forward
Address Down	Address –1	Rewind
Data Up	Data +1	Play Back
Data Down	Data –1	Stop
Store	Write the data to the EE PROM. RAM	Pause

2. Types of Self-diagnostic Feature

MODE		Contents
TEST	Camera adjustment	Refer to Camera Adjustment
	Switching position adjustment	Refer to each adjustment page
	Battery DOWN adjustment	
	Video, Audio adjustment	
ADJUST	Pass Adjustment track shift	When adjusting tape pass, set this mode and shift the tracking.
	Emergency STOP inhibition	Detection of emergency is inhibited. This allows the following items. • Power is not turned off when the battery is ended. • SP/LP is not automatically distinguished. • Emergence is not detected except for TOP/END detection of the TAPE.
	Read of emergence code	The following functions are added to the emergency display function currently in use. ① The lithium battery is not required because to memorize into EE-PROM is allowed. ② The first emergency and the last emergency are memorized. ③ The mode when the emergency is generated is memorized, in addition to the emergency contents.
	Motor single check	Rotating in forward direction, reverse direction, stopping of each motor can be separately controlled. • Drum motor • Capstan motor • Loading motor
	Function switch check	The acceptance of the function switch of the unit can be confirmed by designating an address. On the contrary, RM-95 can command the substitution for the function switch of the unit.
	Mechanical switch check	The contents of the mechanical switch and the mode switch can be confirmed.
	Sensor check	The following sensor is input by performing A/D converting, and the A/D converted value can be confirmed. TOP sensor, End sensor, S REEL FG, T REEL FG, Thermistor for SWP correction, DEW sensor.
	Reception contents check of wireless remote control	The received code contents of the remote control code can be confirmed.

3. Page D Write Protect

Release/set the page D write protect.

Page 1	Address 00

Data	Function
00	Normal (Write protect condition)
01	Write protect release

4. Page F Write Protect

Release/set the page F write protect.

Page 6	Address 00

Data	Function
10	Normal (Write protect condition)
01	Write protect release

5. Test Mode Setting

Each type of test mode is set/released. Release the protect (page: 1, address: 00, data: 01), before setting the data.

Page D	Address 01

Data	Function
00	Normal
01	Test mode 1 Various emergency inhibition and release Drum, capstan, loading motor, reel, tape top, end, DEW SP/LP automatic distinction inhibition, manual switchover 5 minutes pause release inhibition Power off inhibition • release by battery end
02	Test mode 2 1'CH frequency response adjustment (Not used) SP/LP automatic distinction inhibition, manual switchover
03	Test mode 3 Track shift Plays back the track shift Rear lock distinction inhibition during PB SP/LP automatic distinction inhibition, manual switchover
04	Test mode 4 Rear lock mode Rear lock playback is performed SP/LP automatic distinction inhibition, manual switchover
05	Test mode 5 SP/LP automatic distinction inhibition, manual switchover

* This address data will be recorded on the non-volatile memory by pressing the PAUSE button on the adjusting remote control unit. Take note, as when this happens, the test mode will not be released even if the main power is turned off (6.3 Vdc).
* Be sure to return the data of this address data to 00 after completing adjustments/repairs.

6. Emergency code

Troubles (errors) can be checked.

Page D	Address 06

First emergency code

·····The first error code generated

Page D	Address 07

Last emergency code

····· The last error code generated (this data will be modified each time an error occurs.)

* Be sure to rewrite the data of addresses 06 and 07 to 00 after completing repairs/adjustments.
* When rewriting data, be sure to press the PAUSE button of the remote control unit after resetting the data.

Code	Error condition
00	No error
01	Loading motor error
02	Reel error during unloading
03	Other reel errors
04	Capstan error
05	DRUM FG error during drum start up
06	DRUM PG error during drum start up
07	DRUM FG error during drum regular condition
08	DRUM PG error during drum regular condition
09	DRUM Phase error during drum regular

7. Emergency mode

The operation mode during an error outbreak can be checked.

Page D	Address 08

First emergency mode

·····The operation mode when the first error is generated

Page D	Address 09

Last emergency mode

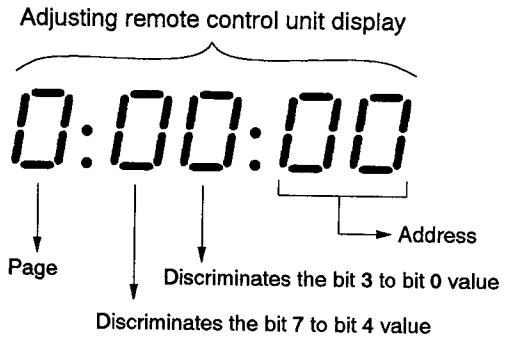
·····The operation mode when the last error is generated
(This data will be modified each time an error occurs.)

* Be sure to rewrite the data of addresses 08 and 09 to 00 after completing repairs/adjustments.
* When rewriting data, be sure to press the PAUSE button of the remote control unit after setting the data.
* Addresses 08 and 09 of page 0 and addresses 08 and 09 of page D have the same functions.

Code	Error condition
00	BEFOR INITIALIZE
01	EJECTED
02	NORMAL STOP
03	FF
04	NORMAL REC
06	NORMAL PB
07	PB PAUSE
12	LOADING
14	REC PAUSE
26	X1
27	1/5 SLOW
31	UNLOADING
36	–X1
37	–1/5 SLOW
46	CUE
47	1/10 SLOW
56	REVIEW
57	–1/10 SLOW
62	STOP TAPE END
66	X2
67	FRAME
72	STOP TAPE TOP
76	–X2
77	–FRAME
83	REWIND
85	REC REVIEW(+)
95	REC REVIEW(–)
A2	EMERGENCY STOP
A5	EDIT SEARCH(+)
B1	EMERGENCY UNLOADING
B2	STOP EMERGENCY 1
B5	EDIT SEARCH(–)
C2	STOP EMERGENCY 2
E2	STOP NO CASSETTE
F5	EDIT PAUSE

8. Bit value Discrimination

It is necessary to discriminate the bit value by the adjusting remote control unit display data for the following items. Discriminate if the bit value is "1" or "0" using the following table.


Adjusting remote control unit display
0:00:00
Address
Page
Discriminates the bit 3 to bit 0 value
Discriminates the bit 7 to bit 4 value

	Remote Control Unit Display	Bit Value			
		bit 3 or bit 7	bit 2 or bit 6	bit 1 or bit 5	bit 0 or bit 4
	0	0	0	0	0
	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
Ⓐ→	8	1	0	0	0
	9	1	0	0	1
	A(*A*)	1	0	1	0
	B(*b*)	1	0	1	1
	C(*c*)	1	1	0	0
	D(*d*)	1	1	0	1
Ⓑ→	E(*E*)	1	1	1	0
	F(*F*)	1	1	1	1

(Example) When the remote control unit display data is "8E", the bit values of bit 7 to bit 4 can be discriminated from column Ⓐ, and that of bit 3 to bit 0 can be discriminated from column Ⓑ.

9. Check of Tape Distinction Switch, etc.

Page 1	Address 3E

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
				$\overline{\text{REC PROOF}}$	ME/$\overline{\text{MP}}$	Hi8/$\overline{\text{Normal}}$	

"1"=Recording impossible
"0"=Recording possible

"1"=ME tape
"0"=MP tape

"1"=Hi8 mode playback
"0"=Normal mode playback

Page 1	Address 23

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
					$\overline{\text{CC DOWN}}$		

"0"=During cassette compartment lock

Page 1	Address 3D

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
V MUTE	A MUTE	VA PB MODE	JOG	PB CLOG	REC CLOG	SYNC DET	LP/$\overline{\text{SP}}$

"1"=LP mode playback
"0"=SP mode playback

"1"=SYNC is detected
"0"=SYNC is not detected

"1"=CLOG is detected
"0"=Normal

"1"=When the PB RF signals are being playback normaly
"0"=Others

"1"=JOG mode
"0"=Other

"1"=Playback mode
"0"=Others

"1"=AUDIO MUTE: ON
"0"=AUDIO MUTE: OFF

"1"=VIDEO MUTE: ON
"0"=VIDEO MUTE: OFF

Page 1	Address 42

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
						DEW	

"0"=Dew outbreak
"1"=Others

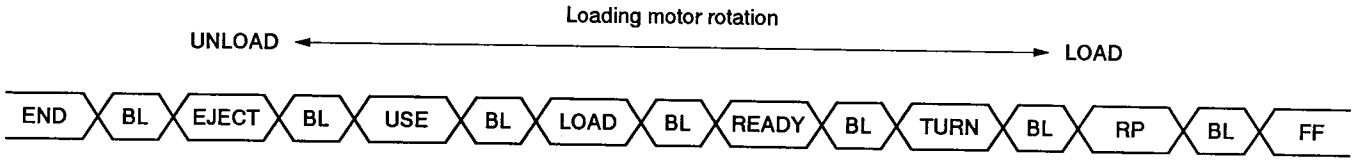
10. Mode Switch Check

The mode switch position (mechanical section condition) can be checked.

Page 1	Address 3E

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
MSW 0	MSW 1	MSW 2					

			POSITION	FUNCTION	CC DOWN
1	1	1	BL	Interval of each position	
0	1	1	END	FULL END processing (T side lock removal)	1
0	0	1	EJECT	Cassette compartment ejection	1
1	0	1	USE	EJECTED (Unskate end)	1
0	0	1	LOAD	LOADING (Skate in)	0
1	0	0	READY	NORMAL STOP position	0
1	1	0	TURN	OFF of pinch roller only with PB ↔ REV (oscillating position)	0
0	1	0	RP	PB, REC, RVS, REV, REW	0
0	0	0	FF	FF/CUE	0



11. Mechanism Control A/D Port Input Voltage Check

Page 4	Address 14

Checking method:

1) Set data: 02 to page: 4, address: 0E.
   (A/D conversion processing active)
2) Set the data in the following table to page: 4, address: 13, and select the A/D port to be displayed.

Data	A/D Port
00	Pin ⑫: AN0 (T REEL FG)
01	Pin ⑪: AN1 (S REEL FG)
02	Pin ⑩: AN2 (ATF ERROR)
03	Pin ⑨: AN3 (BATT SENS)
04	Pin ⑧: AN4 ($\overline{\text{DEW}}$)

3) Check the data of page: 4, address: 14.

Adjusting Remote Control Unit Display Data	A/D Port Input Voltage
FF to 00	Approx. 5 Vdc to 0 Vdc

12. Tape Top/End Sensor Condition Check

Page 4	Address 0A

Checking method:

1) Set data: 10 to page: 4, address: 0E.
   (Tape top/end sensor condition sampling processing active)
2) Check the data of page: 4, address: 0A.

Adjusting Remote Control Unit Display Data	Tape Top/End Sensor Condition
0 0	Tape present (Middle of tape)
0 1	Tape end
1 0	Tape top
1 1	No tape

Tape end sensor condition
Tape top sensor condition
"0"=Non-active (Not receiving light)
"1"=Active (Receiving light)

13. Battery Voltage Check

Page 4	Address 10

Adjusting Remote Control Unit Display Data	Battery Voltage
FF	Approx. 10 Vdc
F0	Approx. 9.4Vdc
E0	Approx. 8.8Vdc
D0	Approx. 8.2Vdc
C0	Approx. 7.5Vdc
B0	Approx. 6.9Vdc
A0	Approx. 6.3Vdc
90	Approx. 5.6Vdc
80	Approx. 5.0Vdc

14. Individual Operations of the Drum, Capstan, and Loading Motor

Page 4	Address 11

1) Adjust the mechanical section to the loading completion condition.
2) Release the protect.
   Page: 1, address: 00, data: 01
3) Set data: 01 to page: 4, address: 0E.
   (Control permission from the adjusting remote control unit of the motor)
4) By setting the data in the following table to page: 4, address: 11, the corresponding motors can be operated individually.
5) After checking the operations, turn off the main power (6.3 Vdc).

Data	Operation
00	Normal
02	Drum forward rotation
04	Drum reverse rotation
06	Capstan forward rotation
08	Capstan reverse rotation
0A	Loading motor forward rotation
0C	Loading motor reverse rotation
01	All motors stop
03	
05	
07	
09	
0B	
0D	
0F	

15. Mode control micro processor key matrix check

The key input can be checked.

Page 1	Address 68~6D

	Bit7	Bit6 (K IN 6)	Bit5 (K IN 5)	Bit4 (K IN 4)	Bit3 (K IN 3)	Bit2 (K IN 2)	Bit1 (K IN 1)	Bit0 (K IN 0)
Address 68 (K OUT 0)		LENS COVER OPEN (MF-214 S973)	VTR POWER (CF-34 S997)		PAUSE (VK-32 S984)		EJECT (DD-67 S901)	
Address 69 (K OUT 1)			CAMERA POWER (CF-34 S997 / SW-223 S519)	FF (VK-32 S983)	PLAY (VK-32 S980)	REW (VK-32 S979)	STOP (VK-32 S976)	
Address 6A (K OUT 2)							COUNTER RESET (CF-34 S995)	
Address 6B (K OUT 3)					TIME (CF-34 S996)	DATE (CF-34 S993)		
Address 6C (K OUT 4)								
Address 6D (K OUT 5)							START/ STOP (SW-223 S520)	REMOTE COMMANDER (ED-37 S990) (TR28/TR30 only)

"1"=key switch ON
"0"=key switch OFF

16. Wireless Remote Control Unit Reception Content Check

Page 1	Address 1E

Wireless remote control unit key pressed	Data
None	FF
TELE	9A
WIDE	9B
Start/stop	99
Rewind	1B
Fast forward	1C
Stop	18
Playback	1A
Data screen	5A
Pause	19
SLOW	23

17. EDIT Switch, Remote Commander Switch Check

Page 1	Address 0A

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
REC MODE (SP/LP)	REMOTE COMMANDER		EDIT				

"1"=LP
"0"=SP

"1"=OFF
"0"=ON

"1"=EDIT ON
"0"=EDIT OFF

18. White Balance Mode and Focus Mode Display/Switchover

Page 1	Address 9A

The mode can be switched when the data of page: 1, address: A3 is set to 04.

Data	White Balance Mode
* 1	INDOOR
* 2	OUTDOOR
* 3	HOLD
* 6	AUTO

Data	Focus Mode
0 *	Manual
1 *	Automatic

* : 0 to F

9. LCD, LED Check, etc.

'age 1	Address A3

ata	Mode
00	Normal
1	Key input prohibited
4	Camera function renewal prohibited

20. Page D Address List

Note 1: The adjustment data initial value is the data to be input before performing video section adjustment (page D), when the page D data has been erased due to some cause.

Note 2: The data listed in the adjustment data memo column are the fixed data.
Check that these data have not been accidentally rewritten, after completing adjustments.

*1 No mark : CCD-TR28/TR30
[ ] : CCD-TR350/TR350PK

Address	Name	Function [ ] indicate the adjustment voltage output terminal	Adjustment data	
			Initial value	Memo column
00	Category code	Not used		
01	Test mode		00	00
02	Destination flag		4A[6A]*1	4A[6A]*1
03	BATT END	Battery end adjustment	8C	
04	SW POSITION	SW POSITION adjustment	00	
05	SW POSITION	SW POSITION adjustment	0A	
06	EMERGENCY code (FIRST)	Error code and mode are memorized. Rewrite the data of these addresses to 00 after repairs/adjustments	00	00
07	EMERGENCY code (LAST)		00	00
08	EMERGENCY mode (FIRST)		00	00
09	EMERGENCY mode (LAST)		00	00
0A	SR DATA (MP Normal SP)	CXA1207 serial data	24	24
0B	SR DATA (MP Normal LP)	CXA1207 serial data	3E	3E
0C	SR DATA (ME Hi8 SP)	CXA1207 serial data	24	24
0D	SR DATA (ME Hi8 LP)	CXA1207 serial data	3E	3E
0E	SR DATA (ME Normal SP)	CXA1207 serial data	24	24
0F	SR DATA (ME Normal LP)	CXA1207 serial data	3E	3E
10	SR DATA (MP Hi8 SP)	CXA1207 serial data	24	24
11	SR DATA (MP Hi8 LP)	CXA1207 serial data	3E	3E
12	SR DATA (EDIT ON Normal)	CXA1207 serial data	3E	3E
13	SR DATA (EDIT ON Hi8)	CXA1207 serial data	3E	3E
14	CAM TITLE BLU R-Y	Camera titler color adjustment [Blue]. Not used		
15	CAM TITLE BLU B-Y	Camera titler color adjustment [Blue]. Not used		
16	CAM TITLE GRN R-Y	Camera titler color adjustment [Green]. Not used		
17	CAM TITLE GRN B-Y	Camera titler color adjustment [Green]. Not used		
18	CAM TITLE CYN R-Y	Camera titler color adjustment [Light blue]. Not used		
19	CAM TITLE CYN B-Y	Camera titler color adjustment [Light blue]. Not used		
1A	CAM TITLE RED R-Y	Camera titler color adjustment [Red]. Not used		
1B	CAM TITLE RED B-Y	Camera titler color adjustment [Red]. Not used		
1C	CAM TITLE VIO R-Y	Camera titler color adjustment [Violet]. Not used		
1D	CAM TITLE VIO B-Y	Camera titler color adjustment [Violet]. Not used		
1E	CAM TITLE YEL R-Y	Camera titler color adjustment [Yellow]. Not used		
1F	CAM TITLE YEL B-Y	Camera titler color adjustment [Yellow]. Not used		
20	Permission plug		94	94
21	Adjustment plug	FORCED VTR ON, CAM ON etc DATA: 01 = FORCED CAMERA POWER ON; 02 = FORCED VTR POWER ON	00	00
22~29		Not used		

Table 9-2 (1).

Address	Name	Function [ ] Indicate the adjustment voltage output terminal	Adjustment data	
			Initial value	Memo column
2A	SLOW ADJ (FOWARD)		00	00
2B	SLOW ADJ (REVERSE)		00	00
2C	STILL ADJ		00	00
2D	BATT REMAIN LEVEL 1	Amount of remaining battery 1	A0	
2E	BATT REMAIN LEVEL 2	Amount of remaining battery 2	99	
2F	BATT REMAIN LEVEL 3	Amount of remaining battery 3	94	
30~42		Not used		
43	1-ch M.T NORMAL	1 ch playback frequency characteristic adjustment [IC158 ②]	C0	
44				
45	2-ch M.T NORMAL	2 ch playback frequency characteristic adjustment [IC158 ③]	C0	
46	REC C RF (EE)	REC C RF level adjustment (EE) [IC156 ⑩]	B8	
47	REC C RF (PB)	REC C RF level adjustment (PB) [IC156 ⑩]	00	
48	RF CONT (ME)	ATF RF level (ME) [IC158 ⑤]	64	64
49	RF CONT (MP)	ATF RF level (MP) [IC158 ⑤]	70	70
4A	EE LEVEL	EE level adjustment [IC156 ⑮]	70	70
4B		Not used		
4C	COMB ADJ	Chroma comb filter adjustment [IC156 ③]	A8	
4D	SR-IR	IR adjustment [IC156 ②]	AE	
4E	Y-FM CARRIER (Hi8)			
4F	Y-FM CARRIER (NORMAL)	Y-FM carrier frequency adjustment [IC156 ⑤]	A8	
50	Y-FM DEVIATION (Hi8)			
51	Y-FM DEVIATION (NORMAL)	Y-FM deviation adjustment [IC156 ⑥]	95	
52	REC Y LEVEL (EE Hi8 ME)			
53	REC Y LEVEL (EE Hi8 MP)			
54	REC Y LEVEL (EE NOR ME)	REC Y recording current adjustment (ME) [IC156 ⑦]	95	
55	REC Y LEVEL (EE NOR MP)	REC Y recording current adjustment (MP) [IC156 ⑦]	95	
56	REC Y LEVEL (PB)	Playback REC Y level [IC156 ⑦]	00	00
57	PB Y LEVEL (EE)	EE PB Y level [IC158 ⑮]	00	00
58	PB Y LEVEL (Hi8)			
59	PB Y LEVEL (NORMAL)	Normal PB Y level adjustment [IC158 ⑮]	B0	
5A	EMPHASIS INPUT LEVEL	EE emphasis input level adjustment [IC156 ④]	A5	
5B	PB LINE LEVEL	Playback emphasis input level adjustment [IC156 ④]	AF	
5C~79		Not used		
7A	1.5 IR	1.5 MHz IR adjustment [IC158 ⑥]	A0	
7B	1.5 DEV	1.5 MHz deviation adjustment [IC158 ⑦]	A0	
7C~FF		Not used		

Table 9-2 (2)

9-2. POWER SYSTEM ADJUSTMENTS

1. Oscillator Frequency Check (DD-67 board)

Mode	Camera record
Subject	Arbitrary
Measurement Point	Q903 collector
Measuring Instrument	Frequency counter
Specified Value	510 ± 35 kHz

Adjusting method:

1) Check that the oscillator frequency satisfies the specified value.

2. Power Voltage Check (DD-67 board)

Mode	Camera record
Subject	Arbitrary
Measuring Instrument	Digital voltmeter
EVF 5V check	
Measurement Point	Pin ⑪ of CN901
Specified Value	4.93 ± 0.15 Vdc
D5V check	
Measurement Point	Pins ⑤ and ⑧ of CN901
Specified Value	4.92 ± 0.15 Vdc
D4V check	
Measurement Point	Pin ④ of CN901
Specified Value	3.98 ± 0.15 Vdc
VID 5V check	
Measurement Point	Pins ⑰, ⑳ of CN901
Specified Value	4.90 ± 0.15 Vdc
RP 5V check	
Measurement Point	Pin ㉒ of CN901
Specified Value	4.89 ± 0.15 Vdc
AU5V check	
Measurement Point	Pin ⑲ of CN901
Specified Value	4.90 ± 0.15 Vdc
CAM5V check	
Measurement Point	Pins ⑦ and ⑩ of CN901
Specified Value	$4.86^{+0.15}_{-0.11}$ Vdc
CAM15V check	
Measurement Point	Pin ⑫ of CN901
Specified Value	15.05 ± 0.4 Vdc
CAM –9V check	
Measurement Point	Pin ⑨ of CN901
Specified Value	–8.5 ± 0.4 Vdc

9-3. SYSTEM CONTROL SYSTEM ADJUSTMENTS

1. Page D Initial Value Input

If the page D data has been erased due to some cause, input the page D initial value before performing adjustments. For details on the initial value, refer to "Page D address list" in "9-1-8. Service Mode".

Mode	E-E
Signal	Arbitrary
Adjustment Page	D
Adjustment Address	00 to 7D

Input method:

1) Release the write protect.
   Page: 1, address: 00, data: 01
2) Select page D, and input the initial value to each address.
   (After setting the data (initial value), be sure to press the PAUSE button of the adjusting remote control unit before changing the address.)

2. Battery End Adjustment

Mode	Camera record
Signal	Arbitrary
Measurement Point	LCD display of the adjusting remote control unit
Measuring Instrument	
Adjustment Page	D
Specified Value	03 (BATT END) 2D (BATT REMAIN LEVEL 1) 2E (BATT REMAIN LEVEL 2) 2F (BATT REMAIN LEVEL 3)

Connection:

1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 9-4.

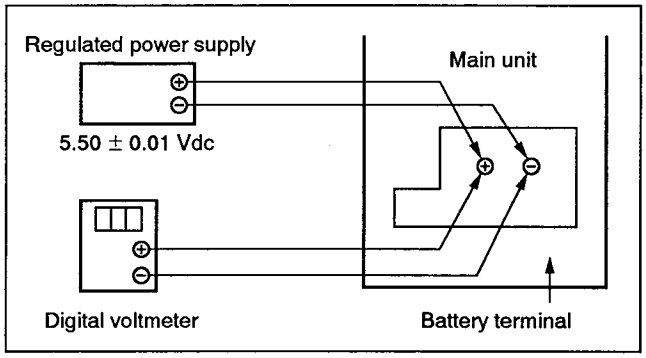


Fig. 9-4.

Adjusting method:

1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display is 6.3 ± 0.1 Vdc.
2) Release the protect.
   Page: 1, address: 00, data: 01
3) Set data: 01 to page: D, address: 01.
   (Test mode 1 setting)
4) Set to the camera recording mode.
5) Adjust the output voltage of the regulated power supply so that the digital voltmeter display is 5.50 ± 0.01 Vdc.
6) Select page: 4, address: 10, read the adjusting remote control unit display data, and set to DEND.
7) Set data DEND to page: D, address: 03, and press the PAUSE button of the adjusting remote control unit.
8) Convert DEND to decimal to obtain DEND´. (Refer to Table 7-6. "Hexadecimal notation − decimal notation conversion table")
9) Obtain the adjustment data (decimal) by following formula (decimal notation calculation), convert to hexadecimal and enter the data into each adjustment address.
   Address: 2D $D_{2D}' = D_{END}' + 18$
   Address: 2E $D_{2E}' = D_{END}' + 14$
   Address: 2F $D_{2F}' = D_{END}' + 8$
   Note: After setting the data, be sure to press the PAUSE button of the adjusting remote control unit before changing the address.
10) Set data: 00 to page: D, address: 01, and press the PAUSE button of the adjusting remote control unit.
    (Test mode 1 release)
11) Perform "Battery Down Check".

3. Battery Down Check

Mode	Camera record
Subject	Arbitrary

Connection

1) Connect the regulated power supply and the digital voltmeter as shown in Fig. 9-4.

Checking method:

Remove the adjusting remote control unit, and perform the following check. If the check is not satisfied, perform from the beginning again.

1) Adjust the output voltage of the regulated power supply so that the digital voltmeter display becomes 6.3 ± 0.1 Vdc.
2) Set to the camera recording mode.
3) Decrease the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.70 ± 0.01 Vdc.
4) Check that the mark on the EVF (viewfinder) display is not lighted up. (TALLY lamp lights up).
5) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.58 ± 0.01 Vdc.
6) Check that the mark and the TALLY lamp on the EVF display on the EVF display blinks every second.
7) Decrease the the output voltage of the regulated power supply so that the digital voltmeter display becomes 5.42 ± 0.01 Vdc.
8) Check that the mark and the TALLY lamp on the EVF display are blinking faster, the VTR stops and the power supply turns off.

9-4. SERVO SYSTEM ADJUSTMENTS

1. Switching Position Adjustment (VS-116 board)

Mode	Playback
Signal	Alignment tape: For tracking adjustment (WR5-1NP)
Measurement Point	CH1: Pin ④ of CN002 (RF SWP) CH2: Pin ③ of CN002 (PB RF)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	04 (SW POSITION) 05 (SW POSITION)
Specified Value	t_1=0 ± 10 μsec

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Set data: 0A to page: D, address: 05.
3) Change the data of page: D, address: 05 and minimize "t_1". (Coarse adjustment)
4) Press the PAUSE button of the remote control unit.
5) Change the data of page: D, address: 04, and adjust so that the switching position (t_1) becomes the specified value. (Fine adjustment)
6) Press the PAUSE button of the adjusting remote control unit.

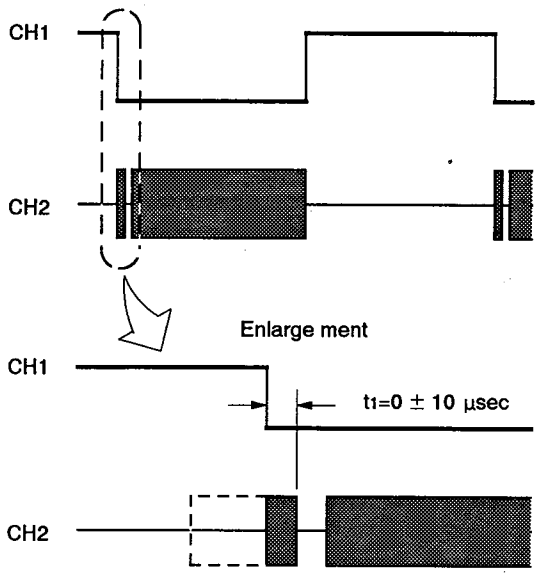


Fig. 9-5.

9-5. VIDEO ADJUSTMENTS

The adjustments of the video system must be performed according to the following adjustment procedure.
The color video signal supplied from the pattern generator is used as the video input signal for adjusting the video system in recording mode. Check that the sync signal and the color burst signal satisfy the specification specified during the adjustment set-up shown in Fig. 9-2.

[Adjusting procedure]

1) Playback frequency characteristic adjustment
2) Flying erase check
3) VXO oscillation frequency check
4) EE level adjustment
5) IR adjustment
6) Y/C separation adjustment
7) Emphasis input level adjustment
8) PB Y level adjustment
9) PB LINE OUT level adjustment
10) Y FM carrier frequency adjustment
11) Deviation adjustment
12) Chroma emphasis fo adjustment
13) REC Y level adjustment
14) REC C level adjustment
15) REC ATF level check
16) REC AFM level check

1. Playback Frequency Characteristic Adjustment (VS-116 board)

Note 1: The adjusting element for CH2 is shown in parentheses [ ].

Mode	Playback
Signal	Alignment tape: For frequency characteristic adjustment (WR5-6N)
Measurement Point	CH1: Pin ③ of CN002 EXT TRIG: Pin ④ of CN002
Measuring Instrument	Oscilloscope TRIG SLOPE: +, [–]
Adjustment Page	D
Adjustment Address	43 (MT 1CH) [45 (MT 2CH)]
Specified Value	3.58 MHz level: 5.5 MHz level= 4: (3 ± 0.3)

Adjusting method:

1) Confirm that the EDIT switch is OFF position.
2) Release the protect.
   Page: 1, address: 00, data: 01
3) Change the data of address: 43 [45] of page D, and adjust the level ratio of 3.58 MHz and 5.5 MHz of PB RF output waveform to the specified value.

   Note 2: After each address adjustment, be sure to press the PAUSE button of the adjusting remote control unit and memorize the data.

   Note 3: If the waveform is not stable, set data: 03 to page: D, address: 01. (Test mode 3 setting)
   After completing adjustment, set data: 00 to page: D, address: 01.

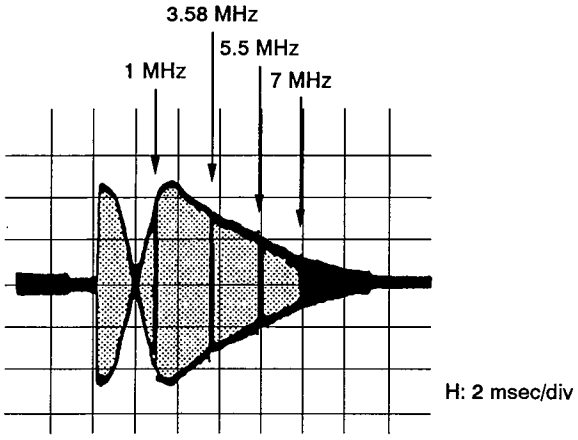


Fig. 9-6.

2. Flying Erase Check (VS-116 board)

Mode	Record
Signal	Arbitrary
Measurement Point	Pin ② of W001 (FE (X))
Measuring Instrument	Oscilloscope and frequency counter
Specified Value	Frequency: approx. 7.5 MHz Voltage: Above 1.5 Vp-p

Note: Use a MP type tape.

Checking method:

1) Check that the oscillation frequency is approx. 7.5 MHz and that the oscillation voltage is above 1.5 Vp-p.

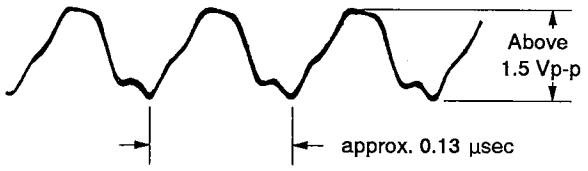


Fig. 9-7.

3. VXO Oscillation Frequency Check (VS-116 board)

Mode	STOP
Signal	Color bar
Measurement Point	Pin ⑫ of IC152
Measuring Instrument	Frequency counter
Specified Value	3579545 ± 70 Hz

Note: Connect the frequency counter via a high impedance (approximately 10 MΩ) and low capacity (below 10 pF) buffer.

Adjusting method:

1) Check that the oscillation frequency of pin ⑫ of IC152 is 3579545 ± 70 Hz.

(3579545 ± 70Hz)

Fig. 9-8.

4. EE Level Adjustment (VS-116 board)

Mode	E-E
Signal	Color bar
Measurement Point	Pin ② of CN101 (VIDEO OUT)[Note]
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	4A (EE LEVEL)
Specified Value	A=1.00 ± 0.025V

Note: Terminate pin ② of CN101 at 75 Ω .
After completing adjustments, remove the 75 Ω resistor.

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 4A, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.

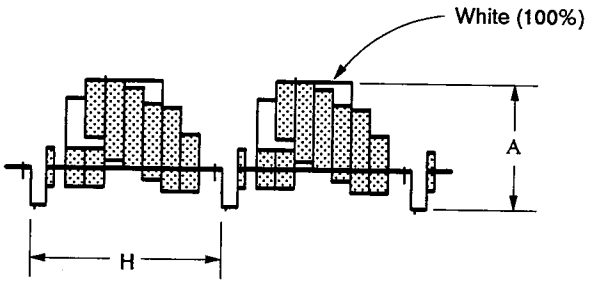


Fig. 9-9.

5. IR Adjustment (VS-116 board)

Mode	E-E
Signal	Color bar
Measurement Point	Pin ⑦ of IC151 (Y COMB OUT)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	4D (SR IR)
Specified Value	Residual chroma component (A) is minimum (below 80 mVp-p)

Connection

1) Connect pin ⑭ of IC151 (VREF: 3.5 Vdc) or pin ② of IC159 to pin ㊿ of IC151 with a jumper wire.

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 4D, and adjust so that the residual chroma component (A) becomes minimum.
3) Press the PAUSE button of the adjusting remote control unit.

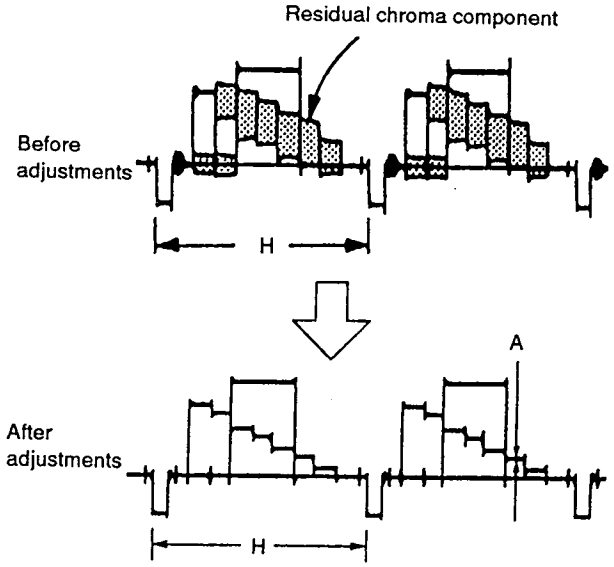


Fig. 9-10.

6. Y/C Separation Adjustment (VS-116 board)

Mode	E-E
Signal	Color bar
Measurement Point	Pin ⑪ of IC151 (C+CD)
Adjusting Element	Oscilloscope
Measuring Instrument	RV051 (Phase)
Adjustment Page	D
Adjustment Address	4C (Y/C SEP DL LEVEL)
Specified Value	Residual chroma component (A) is minimum.

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 4C, and adjust the residual chroma component to minimum.
3) Adjust RV051 so that the residual chroma component (A) becomes minimum.
5) Press the PAUSE button of the adjusting remote control unit.

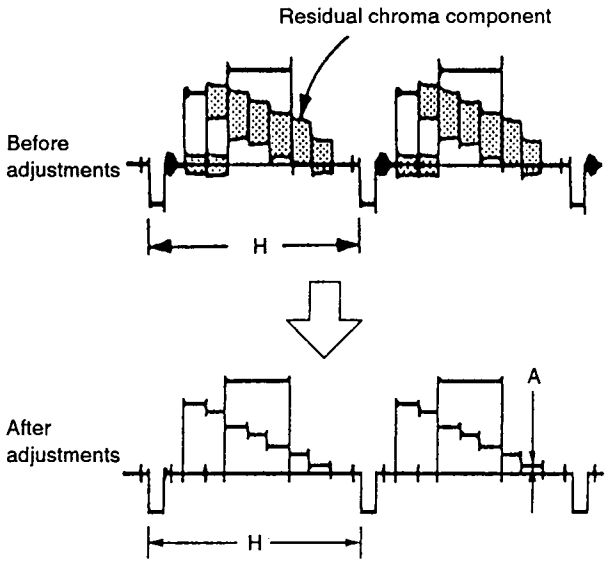


Fig. 9-11.

7. Emphasis Input Level Adjustment (VS-116 board)

Mode	E-E
Signal	Color bar without burst signal
Measurement Point	Pin ③ of IC155 (or Pin ③ of IC151)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	5A (EMPHASIS INPUT LEVEL)
Specified Value	A=0.50 ± 0.025V

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 5A, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.

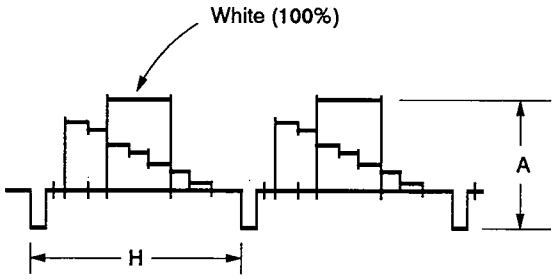


Fig. 9-12.

8. PB Y Level Adjustment (VS-116 board)

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Pin ㉑ of IC151
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	• Normal mode 59 (NORMAL PB Y LEVEL)
Specified Value	A=0.50 ± 0.025V

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Playback the color bar section of the normal mode alignment tape (WR5-5NSP).
3) Change the data of page: D, address: 59, and adjust so that the Y signal level (A) becomes the specified value.
4) Press the PAUSE button of the adjusting remote control unit.

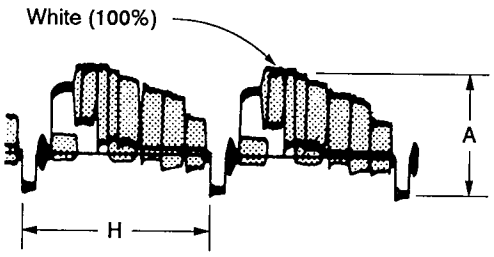


Fig. 9-13.

9. PB LINE OUT Level Adjustment

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP) Color bar section
Measurement Point	Video output terminal (terminated at 75 Ω)
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	5B (PB LINE LEVEL)
Specified Value	A=1.0 ± 0.025V

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 5B, and adjust so that the video signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.

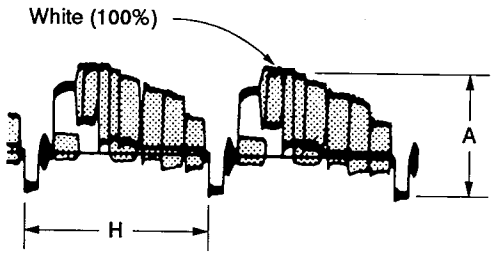


Fig. 9-14.

10. Y FM Carrier Frequency Adjustment (VS-116 board)

Mode	E-E
Signal	No signal
Measurement Point	Pin ⑤ of IC003 (REC Y RF OUT)
Measuring Instrument	Frequency counter
Adjustment Page	D
Adjustment Address	4F (Y FM CARRIER)
Specified Value	4.38 ± 0.04 MHz

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 4F, and adjust so that the Y FM carrier frequency becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.
4) Perform "Deviation Adjustment".

Pin ⑤ of IC003 waveform

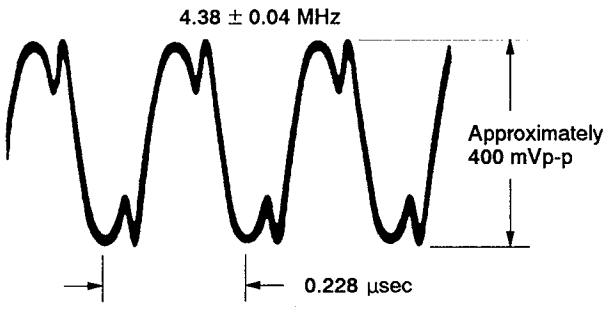


Fig. 9-15.

11. Deviation Adjustment (VS-116 board)

Mode	Record and playback
Signal	Color bar
Measurement Point	Pin ㉑ of IC151
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	51 (Y FM DEVIATION)
Specified Value	A=0.50 ± 0.025V

Note: Check that "Emphasis Input Level Adjustment", "PB Y Level Adjustment" and "Y FM Carrier Frequency Adjustment" have been completed.

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Record the color bar signal.
3) Playback the recorded signal.
4) Check the playback signal level (A).
   Specification:A=0.50 ± 0.025V
5) If the specification is not satisfied, change the data of page: D, address: 51, and repeat steps 2) to 4).

Playback signal level	Changing the data
When smaller than the specified value	Increase
When bigger than the specified value	Decrease

6) Press the PAUSE button of the adjusting remote control unit.

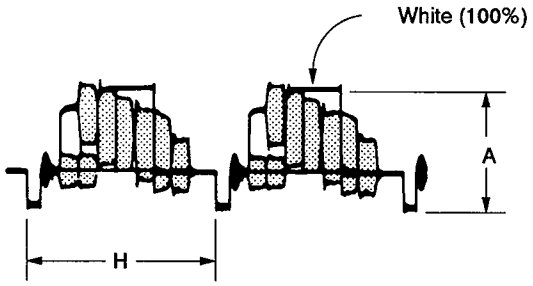


Fig. 9-16.

12. Chroma Emphasis fo Adjustment (VS-116 board)

Mode	E-E
Signal	Color bar
Measurement Point	Pin ㉔ of IC152
Measuring Instrument	Oscilloscope
Adjustment Element	FL153
Specified Value	Minimum fo component

Connection:

1) Connect pin ㉔ of IC152 to GND with a 3.3 kΩ resistor (1-249-423-11).

Adjusting method

1) Adjust FL153 so that the amplitude of the latter section of the chroma signal (yellow section) becomes minimum.

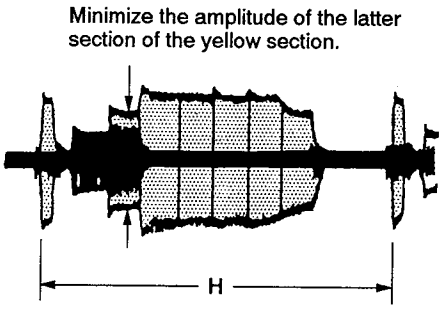


Fig. 9-17.

13. REC Y Level Adjustment (VS-116 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ⑤ of IC003
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	55 (REC Y LEVEL EE NOR MP) 54 (REC Y LEVEL EE NOR ME)
Specified Value	A=225 ± 5 mVp-p

Note: Use a MP type tape.

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 55, and adjust so that the Y signal level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.
4) Set the data of page: D, address: 55 to page: D, address: 54.
5) Press the PAUSE button of the adjusting remote control unit.

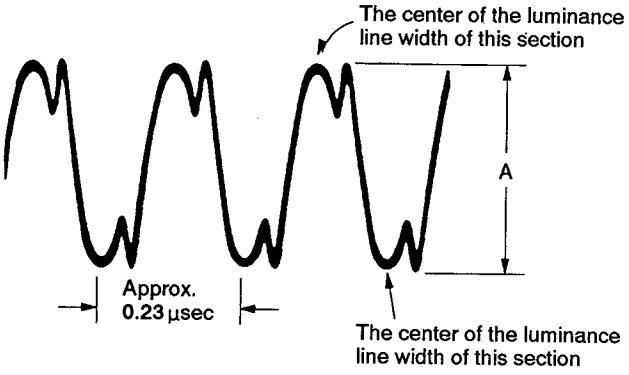

The center of the luminance line width of this section
A
Approx.
0.23 µsec
The center of the luminance line width of this section

Fig. 9-18.

14. REC C Level Adjustment (VS-116 board)

Mode	Record
Signal	Color bar
Measurement Point	Pin ③ of IC003
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	46 (REC C RF (EE))
Specified Value	A=120 ± 10 mVp-p

Note: Use a MP type tape.

Adjusting method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 46, and adjust so that the REC C level (A) becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.

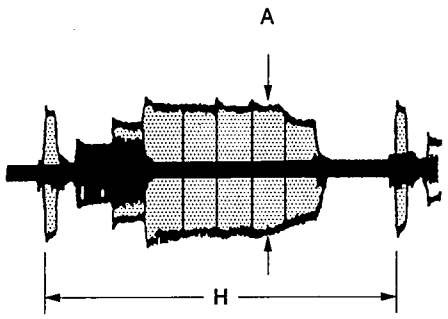


Fig. 9-19.

15. REC ATF Level Check (VS-116 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ㉔ of IC001 (REC 1CH)
Measuring Instrument	Oscilloscope
Specified Value	A=8 ± 2 mVp-p

Note: Use a MP type tape.

Connection:

1) Remove the AU-171 board CN602.

Checking method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) To reduce the REC Y signal, set data: 00 to page: D, address: 55.
   Note: Don't press the PAUSE button of the adjusting remote control unit.
3) Check that the REC ATF signal level (A) satisfies the specified value.
4) Turn the main power supply (6.3V) off.

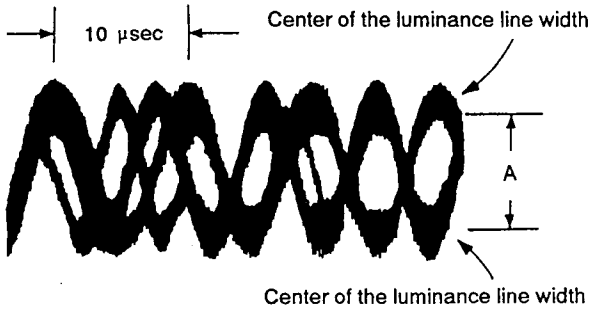


Fig. 9-20.

16. REC AFM Level Check (VS-116 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ㉔ of IC001 (REC 1CH)
Measuring Instrument	Oscilloscope
Specified Value	A=9 ± 2 mVp-p

Note: Use a MP type tape.

Connection:

1) Connect Pin ⑨ of IC404 and GND with a 0.01 μF capacitor (1-101-004-00).

Checking method:

1) Release the protect.
   Page: 1, address: 00, data: 01
2) To reduce the REC Y signal, set data: 00 to page: D, address: 55.
   Note: Don't press the PAUSE button of the adjusting remote control unit.
3) Check that the REC AFM signal level (A) satisfies the specified value.
4) Turn the main power supply (6.3V) off.

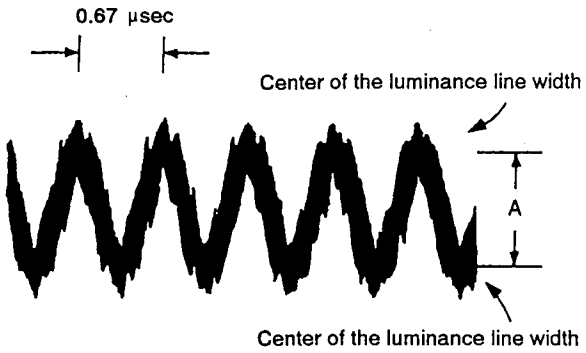


Fig. 9-21.

9-6. AUDIO SYSTEM ADJUSTMENT

- Perform the adjustment using the color bar signal as a video signal input.

[Connecting the measuring instruments for the audio]

Connect the audio system measuring instruments besides the video system measuring instruments as shown in Fig. 9-22, and perform adjustments with the power switch [player] position.

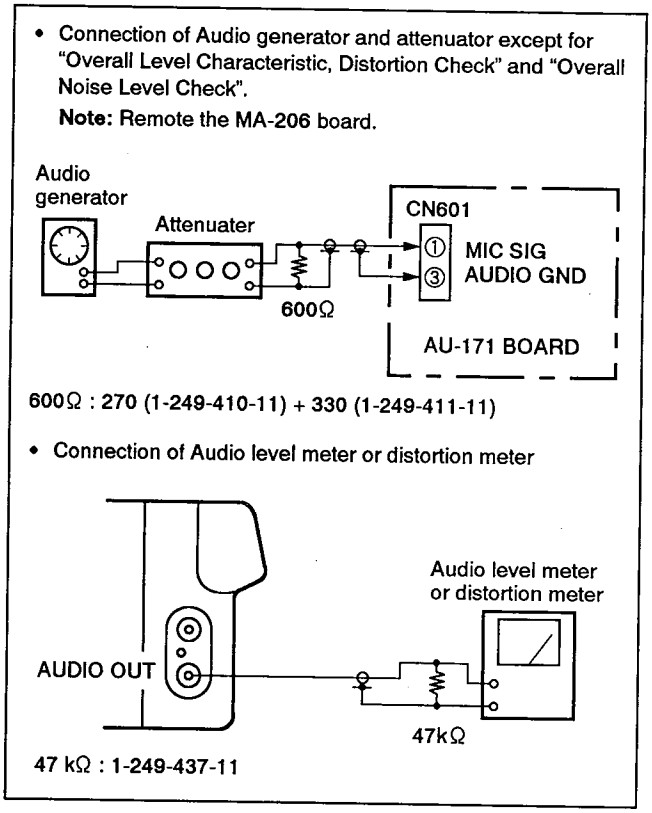

• Connection of Audio generator and attenuator except for "Overall Level Characteristic, Distortion Check" and "Overall Noise Level Check".
Note: Remote the MA-206 board.
Audio generator
Attenuater
600Ω
CN601
① MIC SIG
③ AUDIO GND
AU-171 BOARD
600Ω : 270 (1-249-410-11) + 330 (1-249-411-11)
• Connection of Audio level meter or distortion meter
AUDIO OUT
Audio level meter or distortion meter
47kΩ
47 kΩ : 1-249-437-11

Fig. 9-22.

[Adjustment Procedure]

1) E-E output level check
2) IR adjustment
3) Deviation adjustment
4) Carrier frequency check
5) Record level check
6) Overall level characteristics, distortion check
7) Overall noise level check

1. E-E Output Level Check (AU-171 board)

Mode	Record
Signal	400 Hz, –36.1 dBs, pin ① of CN601
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter
Specified Value	–7.5 ± 2 dBs

Checking method:
1) Check that the 400 Hz signal level satisfies the specified value.

2. IR Adjustment (AU-171 board)

Mode	Playback
Signal	Alignment tape: For checking operations (WR5-5NSP)
Measurement Point	+: Pin ⑥ of IC601 –: Pin ㊹ of IC601 (C629 ⊕)
Measuring Instrument	Digital voltmeter
Adjustment Page	D
Adjustment Address	7A (1.5 IR)
Specified Value	The DC voltage difference between pins ㊹ and ⑥ is 0 ± 10 mVdc

Adjusting method:
1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 7A and adjust so that the DC voltage becomes 0 ± 10 mVdc.
3) Press the PAUSE button of the adjusting remote control unit.

3. Deviation Adjustment

Mode	Playback
Signal	Alignment tape: For checking the operation (WR5-5NSP)
Measurement Point	Audio output terminal
Measuring Instrument	Oscilloscope
Adjustment Page	D
Adjustment Address	7B (1.5 DEV)
Specified Value	–7.5 ± 0.5 dBs

Adjusting method:
1) Release the protect.
   Page: 1, address: 00, data: 01
2) Change the data of page: D, address: 7B, and adjust so that the 400 Hz signal level becomes the specified value.
3) Press the PAUSE button of the adjusting remote control unit.

4. Carrier Frequency Check (AU-171 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ㉛ of CN602 (REC AFM)
Measuring Instrument	Frequency counter (Note 1)
Specified Value	1.500 ± 0.002 MHz

Note: Use a high impedance (above 1 MΩ) and low capacity (below 20 pF) probe.

Checking method:
1) Check that the 1.5 MHz carrier frequency satisfies the specified value.

5. Record Level Check (AU-171 board)

Mode	Record
Signal	No signal
Measurement Point	Pin ㉛ of CN602 (REC AFM)
Measuring Instrument	Oscilloscope
Specified Value	A=48 ± 8 mVp-p

Checking method:
1) Check that the 1.5 MHz carrier level satisfies the specified value.
   (Read the center of the luminance line width and note down the level read.)

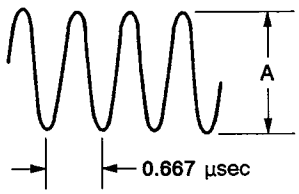


Fig. 9-23.

6. Overall Level Characteristic, Distortion Check

Mode	Self recording/playback
Signal	400 Hz, –66 dBs: Ext mic jack
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter and distortion meter
Specified Value	Level: –7.5 ± 2 dBs Distortion rate: Below 0.5% (Note 1)

Note: 1) Value when the following filter is used

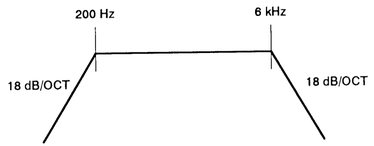


Fig. 9-24.

Checking method:
1) Input the 400 Hz, –66 dBs signal to the ext mic jack.
3) Remove the input signal.
4) Playback the recorded section.
5) Check that the 400 Hz signal level of the audio output terminal is –7.5 ± 2 dBs, and that the distortion rate is below 0.5% (Note 1).

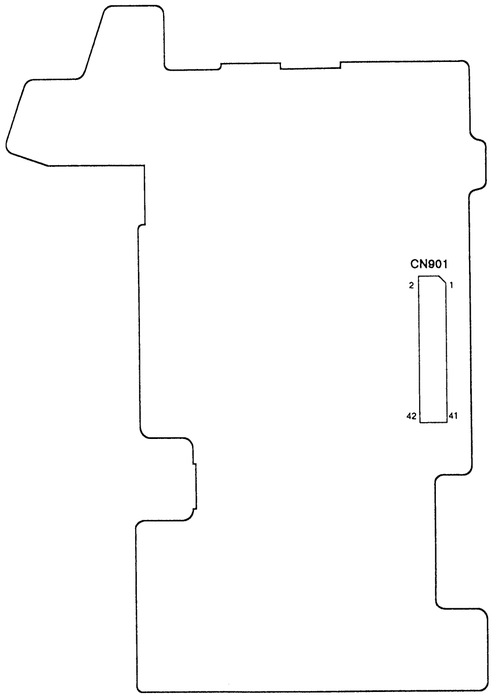
7. Overall Noise Level Check

Mode	Self recording
Signal	No signal: Ext mic jack
Measurement Point	Audio output terminal
Measuring Instrument	Audio level meter (Use an IHF-A curve auditory correction filter)
Specified Value	Below –55.0 dBs

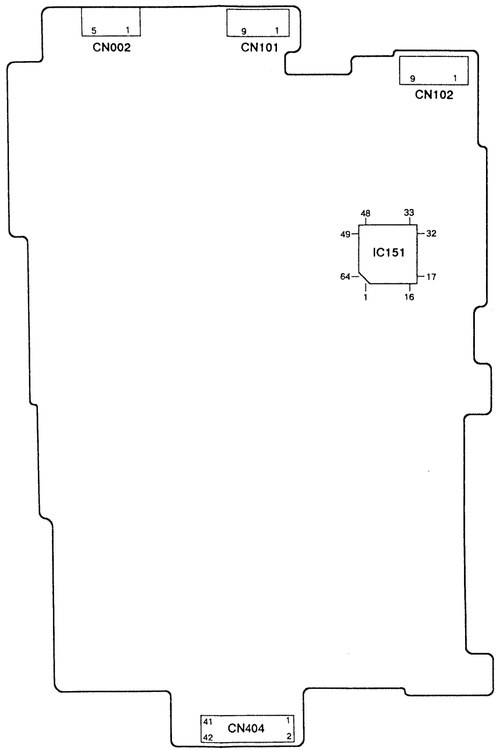
Checking method:
1) Insert the shorting plug to the ext mic jack.
2) Record.
3) Playback the recorded section.
4) Check that the noise level of the audio output terminal is below –55.0 dBs.

9-7. ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

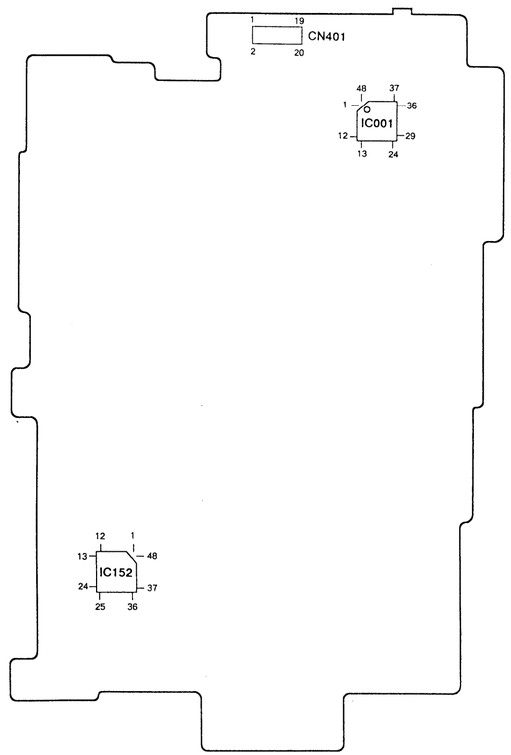
DD-67 BOARD (COMPONENT SIDE)



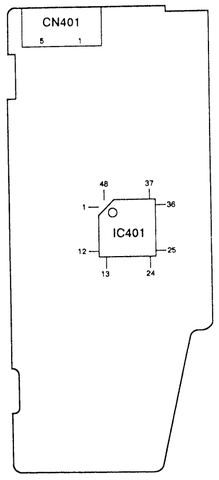
VS-116 BOARD (COMPONENT SIDE)



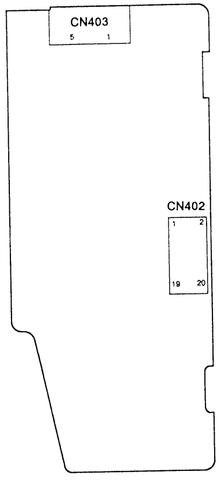
VS-116 BOARD (CONDUCTOR SIDE)



AU-171 BOARD (COMPONENT SIDE)



AU-171 BOARD (CONDUCTOR SIDE)



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